

PREFACE

The twenty-seventh volume of the Thermophysics series is devoted to investigations of heat transfer, hydrodynamics, and flow mixing in gas-cooled fuel rod assemblies in longitudinal flow with a marked change in geometric characteristics of the cells along the assembly radius. The investigations were conducted at the Lithuanian Energy Institute for a number of years.

The book presents data of the experimental and theoretical study of local heat transfer and hydrodynamics in assemblies of smooth and rough rods, spaced using honeycomb spacer grids. Along with assemblies with spacer grids, consideration was given to assemblies with a wire wrapping.

Extensive experimental data made it possible to develop a number of universal calculating procedures and programs for the analytical cell-by-cell calculation of heat transfer and hydrodynamics in assemblies in longitudinal flow, the calculation of shear stresses at the wetted surfaces of assemblies, and the determination of local resistances of honeycomb spacer grids.

Special attention was given to the study of turbulent lateral mixing and structure of flow in rod assemblies with a wire wrapping.

The experimental setups and methods of study are described in detail. A part of the most characteristic experimental data is tabulated. The results are correlated in the form of calculational dimensionless similarity relations suitable for practical application. Recommendations are given for calculating the flow cross mixing in rod assemblies.

The integrated numerical and experimental study of thermohydraulic characteristics provided an explanation of some specific features of heat transfer and hydrodynamics in such complex systems. The obtained information is needed for improving the reliability of operation of various modern gas-cooled heat-transfer devices and will be useful in developing fuel assemblies of new nuclear reactors with various coolants.

The monograph incorporates results of the experimental investigations, conducted by the author together with Dr. J. Kolesnikov (Parts 5 and 6) and Dr. A. Sakalauskas (Parts 6 and 7).

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The monograph is devoted to the researchers and engineers working in the field of heat transfer, nuclear and chemical industry. The monograph will be useful to students, Ph.D. Candidates and university lecturers as well.

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