

## PREFACE

This book is concerned with relationships governing high-rate, enhanced turbulent heat transfer in gas-cooled channels, derived as a part of an ongoing study of these problems conducted during the past decade in our Institute. It continues a cycle of study of local heat transfer and friction in smooth annuli under conditions when variability of physical properties of the working fluid must be taken into account.

This book presents results of detailed measurements of fluid-dynamic and thermal parameters on smooth and rough heat-emitting cylinders in axial flow, and heat-transfer and hydraulic-drag coefficients in rough annular and helical channels and in bundles of twisted tubes in axial flow. Data on heat transfer and drag obtained for rough annular channels are recalculated for conditions prevalent in bundles of rough tubes.

A place of significance is assigned in the book to the study of flow structure and turbulence in bundles of twisted tubes. This made it possible to explain a number of features specific to heat transfer in such systems. This information is necessary for improving the reliability of gas-cooled heat exchangers operating at high heat flux densities. The physical model of flow in bundles of twisted tubes is refined on the basis of flow-structure data.

The experimental arrangements and techniques are described. The results are correlated in a general form, which is suitable for practical application over a wide range of operating and geometric parameters. A part of the most typical experimental data is given in tabulated form.

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**The authors**