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BOOK REVIEWS

A. E. BERGLES, J. G. COLLIER, J. M. DELHAYE, G. F. HEWITT and F. MAYINGER, **Two-Phase Flow Heat Transfer in the Power and Process Industries**. Hemisphere, Washington, 1980, 707 pp., $55.00.

RECENTLY it has become common for a group of competent authors to write a book devoted to some special active field of research with the aim to collect and give the overview on recent developments in the field. This book is one of those which could be classified in the literature mostly needed for those active in the field as well as to those interested in taking advantage of the availability of the results obtained through research and development. *Two-Phase Flow Heat Transfer in Power and Process Industries* is divided into 22 topics and shared between the authors in accordance with their competency for particular subjects.

The first four topics are devoted to the basic knowledge of description of the two-phase flow. J. M. Delhaye is the author of these. With the competence and high background knowledge of fluid mechanics these chapters are an excellent review of the present knowledge of the mathematical tool needed for the description of two-phase flow. Starting with local instantaneous mass, momentum, energy and entropy equations, the authors have described the methodology used to obtain space and time averaged equations which represent the basic equations for the two-phase flow modelling. A simplified procedure for homogeneous and two fluid models and its application to the channel flow and to the flow through the other geometries with sudden expansion and contraction were also shown.

Basic heat transfer in two-phase systems is divided into six chapters, namely: introduction to the two-phase heat transfer (G. F. Hewitt), pool boiling (A.E. Bergles), forced convective boiling (J. G. Collier), nature, mechanism and production of burn out (G. F. Hewitt), post-dryout heat transfer (J. G. Collier) and heat transfer in condensation (J. G. Collier). Although lack of the homogeneity between the chapters is one of the characteristics of these topics, the information given within these chapters is an excellent collection of data and correlations related to the different mode of two-phase heat transfer available in Western literature.

A group of chapters in this book is devoted to those topics which are strongly related to two-phase systems. Stability of two-phase flow (A.E. Bergles) is given by systematic classification of flow instability with the description of the physical mechanism and parametric effects summerising observed phenomena of the two-phase instability. In this group of chapters there is a chapter devoted to the scaling and modelling laws in two-phase flow and boiling heat transfer (F. Mayinger). In order to generalize the present knowledge of the behaviour of two-phase systems and original approach to the problem of scaling laws in two-phase flow is given. Since the measurement technique for particular two-phase applications represents a separate subject in any two-phase study it is understandable that in one of the chapters in this book a review of the present state of the art is given. J. M. Delhaye is the author of several studies of this subject so that the review given in this chapter gives a most recent development of measurement techniques used in the study of two-phase system under different conditions. Recent development in the optical instrumentations used for the study of two-phase flow is the obvious reason which leads the authors of this book to induce a separate chapter devoted to the review of the state of art in the advancement of optical instrumentation. F. Mayinger has developed many different techniques which are specially used in two-phase flow measurement, but his work in holographic interferometry has become a milestone in the recent development of optical instrumentation. The most important aspect of this book is its devotion to the application of the present knowledge to the two-phase flow problems in the power and process industries. Based on the background described in previous chapters the rest of the chapters of the book are devoted to the application of two-phase flow knowledge, namely: introduction to two-phase flow problems in the process industries (G. F. Hewitt), multicomponent boiling and condensation (J. G. Collier), two-phase flow problems in the power industries (J. G. Collier), design of boiling and condensing plant (G. F. Hewitt), industrial application of heat transfer augmentation (A. E. Bergles), nuclear plant safety (A. E. Bergles), and chemical plant safety (F. Mayinger).

It should be mentioned that the authors of this book should be encouraged to put more effort into a further homogenization of the material with the emphasis on developing a unified approach to the same problems. One of the essential disadvantages of this book is the lack of insight into the literature which has not been written in English. It particularly applies to those chapters which did not include a single reference written in a language other than English. Although this book has grown out of discussion held during NATO Advanced Study Institute on Two-Phase Flow and Heat Transfer held in Istanbul, Turkey in 1976, and short courses sponsored by Hemisphere Publishing Corporation and Brookhaven National Laboratory held in 1978 at BNL in Upton, New York, U.S.A. and in 1980 at the University of Hannover in Hannover, F. R. Germany, as a result of the revised versions of the lecture notes it is felt that the material is of interest and value to students, researchers and practitioners.

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