

BOOK REVIEWS

Heat Exchangers

by Holger Martin

Hemisphere Publishing Corporation,
1992, 207 pp., \$45.00

Most of the books on heat exchangers provide the reader with a systematic approach to the design of heat exchangers by accounting for the calculations of the heat transfer coefficients, fluid flow and the mean temperature differences as the basic parameters for establishing their size. The topics of heat transfer and fluid flow are well covered by many books, but it is hard to find a book dealing with the mean temperature difference as the main topic.

This book intends to fill this gap by dealing with the basic principles of deriving the mean temperature difference. It shows the application of heat transfer in calculating the temperature profiles for a variety of flow configurations in commonly used types of heat exchangers.

The book is classified as a textbook, and the author intends to address students of engineering and science in the field of chemistry, mechanics and physics. The knowledge of university-level mathematics, thermodynamics and heat transfer is considered a prerequisite. However, this should not be seen as a limiting factor in finding its usefulness by a broader readership in related industries.

The first chapter discusses the fundamental analysis of elementary types of heat exchangers in pure co-current and countercurrent flow configurations. The mathematical solutions of first degree differential equations by reducing and normalizing parameters are given, and

the term "heat exchanger effectiveness" is defined and compared with the LMTD correction factor. The second chapter deals with the heat exchanger effectiveness for various flow configurations as they occur in heat exchangers used in the industries, ranging from simple, agitated vessels to crossflow tube banks, spiral plates and regenerators. The approach of flow cell model is applied to derive the total efficiency of a heat exchanger and express it as a function of the number of transfer units. The last chapter is dedicated to numerical examples on heat exchanger design.

This work is a welcome contribution to the art of heat exchanger design. It should be a helpful guide in understanding the effect of the flow configurations on the mean temperature difference and the performance of the heat exchanger. Even though at times the text may be hard to follow by a practicing engineer, the book should not be missing in a technical library.

G. J. Vago

Combustion Measurements

Edited by N. Chigier

Hemisphere Publishing, New York,
1991, 535 pp., \$125.00

As with all multi-authored books, *Combustion Measurements* benefits from the expertise of its numerous contributors in their respective areas of research and development. At the same time, it suffers from the lack of uniformity in the structure of the twelve chapters and in the range of applications of the various,

mainly laser, measurement techniques. The book describes or summarizes an extensive range of mature point or planar techniques, including combinations capable of quantifying velocity-scalar correlations, from the extensively used technique of laser velocimetry (referred to interchangeably as LDV or LDA) to the less known technique of Fourier transform infrared spectroscopy. Unfortunately, recently developed techniques such as particle image velocimetry and degenerate four-wave-mixing are not covered. Even more surprising is that the only reference is to coherent anti-stokes Raman spectroscopy.

Despite the commercial interests of a number of contributors, the present capabilities of the techniques and their potential for future development are described in a balanced and objective manner. On the application side, emphasis, quite understandably, has been given to steady combustion, except for the chapter on flowfield holography; however, the discussion on laser velocimetry could have benefitted from the extensive experience obtained in applying LDV to the technically important field of unsteady, premixed combustion in gasoline engines.

Overall, the book succeeds in bringing together the principles of each technique, details of the related instrumentation and examples of successful applications. The level of detail is such that the book can be useful to a wide range of engineers, mainly mechanical or chemical, and applied physicists involved in research and development in industry and academia as well as to graduate students.

C. Arcoumanis

Books Received But Not Reviewed

Liquid-Metal Coolants—For Heat Pipes and Power Plants

V. A. Kirillin, Editor

Hemisphere Publishing Corp., 272 pp., \$99.00

Finite-Time Thermodynamics and Thermoeconomics

S. Sieniutycz and P. Salamon, Editors
Taylor & Francis, 308 pp., \$55.00

The Finite Element Method—Basic Concept and Applications

D. W. Pepper and J. C. Heinrich
Hemisphere Publishing Corp., 240 pp., \$59.00

Thermal Radiative Transfer and Properties

M. Q. Brewster

John Wiley, 543 pp., \$69.95

Flow Modelling in Industrial Processes

A. W. Bush, B. A. Lewis and M. D.

Warren, Editors

Ellis Horwood, 256 pp.

Advances in Drying, Vol. 5

A. S. Mujumdar, Editor

Hemisphere Publishing Corp., 369 pp., \$99.50

Universal Crossover Approach to

Description of Thermodynamic

Properties of Fluid and Fluid Mixtures

M. A. Anisimov and S. B. Kiselev

Harwood Academic Publisher, 121 pp., \$69.00

Extended Thermodynamic Systems

S. Sieniutycz and P. Salamon, Editors

Taylor & Francis, 458 pp., \$69.00

Flow, Diffusion and Rate Processes

S. Sieniutycz and P. Salamon, Editors

Taylor & Francis, 493 pp., \$69.00

Perturbation Methods for Engineers and Scientists

Alan W. Bush

CRC Press, 1992, 303 pp., £16.95