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Heat Exchanger Design. By A. P. Fraas and M. N. Ozisik, John Wiley & Sons, N.Y. (1965), 379 pp., \$17.50.

The optimum design of heat exchangers is based on both the application of theories and practical considerations such as selection, fabrication, installation, cost estimation, and testing. Generally speaking, valuable information gained through practical experience in the design and operation of heat exchangers cannot be found in an ordinary heat-transfer text. This book attempts to bridge the gap between design theory and practice for a wide variety of heat-exchange equipment. In preparing this book, the authors have drawn extensively on their experience in special applications of heat-exchanger technology. Their intended purpose, which is "... to help practicing engineers apply their formal backgrounds in fluid flow and heat transfer to the practical problems posed by the design, selection, testing, or installation of many sorts of heat exchangers," has been fulfilled.

The first half of the book presents the basic principles and analytical techniques applicable to virtually all types of heat-exchanger design work. In general, these subjects are discussed with little mathematical rigor. In the chapter on heat transmission and fluid flow, for instance, only the most fundamental concepts and theories are summarized strictly from the point of view of practical application. The authors state that the reader is presumed to be familiar with a basic text such as Jakob's *Heat Transfer*. For more detailed or advanced treatment of the theory of heat exchangers, therefore, readers must consult such a text. The authors treat two specific subjects, boiling heat transfer and flow distribution, in separate chapters. In these chapters, a good deal of space is devoted to discussing problems associated with two-phase flow, flow stability under boiling conditions, and to the analysis of the causes and ill effects of poor flow distribution such as hot spots in nuclear reactors. Both the theory of static-stability analysis and calculational procedures for predicting pressure drop for boiling with preheating and superheating are covered. This material can seldom be found in an existing heat-transfer text. The reader interested in structural matters should be familiar with design standards such as those prepared by the Tubular Exchanger Manufacturers Association (TEMA) and the American Society of Mechanical Engineers (ASME). Indeed, the book does not treat the subject area of structural analysis in great depth and one would need to refer to other books and papers, some of which are referenced in the book. Thus, the book does not serve as a design manual, but does supplement the existing reference material by calling attention to, and outlining the

solution of, many problems that are encountered in the design of heat exchangers.

The major content of the second half of the book amounts to a discussion of the application of design techniques and practical considerations to general classes of heat-exchange equipment such as liquid-liquid exchangers, liquid-gas exchangers, gas-gas exchangers, boilers, condensers, and cooling towers. Within these general classes of equipment, the characteristics of a great variety of conventional, as well as special-purpose heat exchangers, are presented with the emphasis on variety. Informative illustrations are given in all sections of the book including photographs of typical heat exchangers, boiling and condensing flow, and various elements of heat-transfer matrices.

A handbook section of over 100 pages is included and contains a rather complete collection of tables and charts that are essential to heat-exchanger design work. Especially useful to the reader is the inclusion of data on material properties at temperature extremes.

The book is well organized and well written and will be useful to those who are involved in the design, fabrication, or operation of heat-exchange equipment.

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About the Reviewers: Dr. Hsu is a graduate of the National Taiwan University and of the University of Houston; he completed his graduate studies at Houston in 1962 immediately before joining the staff at Brookhaven. He is a member of the Heat Transfer Group of the Nuclear Engineering Department and is the author of a number of papers in the field of heat and mass transfer.

Mr. Hoffman has been engaged in the design and engineering analysis of liquid-metal systems components and of advanced reactor concepts at Brookhaven since 1956 and is now in the Mechanical Engineering Design Group. He is an engineering graduate of New York University.

Organic Coolant Summary Report. R. F. Makens, Editor, 465 pages, \$7.80, United States Atomic Energy Commission (December 1964).

The *Organic Coolant Summary Report* was prepared in late 1964 to present a summary of the results of the development work carried out by the USAEC since 1955 on various aspects of organic coolant technology. It is designed to serve research and development staffs who desire to become better acquainted with the current status of work performed or being done with organic coolants, the areas requiring further investigation, and the areas where the problems are reasonably well solved. The report is directed to scientists and engineers not necessarily familiar with organic coolant characteristics and their uses.

The book consists of 465 pages of well referenced material covering the organic reactor concept, the properties of unirradiated and irradiated organics, coolant reclamation, improved organic coolants, film formation on heat transfer surfaces, dosimetry, coolant chemistry, and various analytical methods for measurement of physical and chemical properties. It is a compilation of articles by