Radiative Properties, and Heat Transport in Liquid Helium II

The material was originally presented by various contributors in a short course, and was later expanded and edited into the form of a book. This organizational development is reflected through the rather uneven coverage of different topics as well as the emphasis placed on each topic as expressed by each contributor. Specifically, two-thirds of the book deal with boiling, condensation and two-phase flow (Part II), while the rest is spread very thinly on conduction and convection heat transfer (Part I), and radiation and helium II heat transport (Part III). Partly due to its comprehensive coverage, Part II contains a great deal of valuable and up-to-date information, assembled altogether in a single treatise for the first time. A better overall balance would be achieved, however, if more coverage on low-temperature thermophysical properties and insulation systems were incorporated into the conduction chapter (Chapter 2) and radiation characteristics of metal surfaces at low temperatures were treated in the radiation chapter (Chapter 14). Indeed, the title of radiative properties for Chapter 14 is quite misleading since only the radiative properties and effects of cryodeposit layers are considered.

For readers who are interested in additional reading and information about cryogenic heat transfer, the following monographs are recommended: *Advances in Cryogenic Heat Transfer*, edited by K. J. Bell, AIChE Chemical Engineering Progress Symposium Series, No. 87, Vol. 64, 1968; Cryogenic Heat Transfer by J A. Clark, *Advances in Heat Transfer*, Vol. 5, 327–517, 1968; and Cryogenic Insulation Heat Transfer by C. L Tien and G. R. Cunnington, *Advances in Heat Transfer*, Vol. 9, 349–417, 1973.

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JAN F. KREIDER and FRANK KREITH, **Solar Heating and Cooling.** Scripta, Washington D.C. (1975) 342 pp.

THE ENERGY crises has drawn our attention to the fast rate of consumption of primary fuels by mankind. This has stimulated interest for the development of the possibilities of using "flow-energy" supplies, especially solar energy. In the U.S.A. a number of scientists and engineers have been studying the use of solar energy already for a few decades. It is very valuable that two of them have written this practical book on the use of solar energy for heating and cooling.

The authors give the necessary fundamentals on heat transfer and solar radiation followed by an extensive and rather complete discussion on practical methods and system evaluation, including the economic factors.

The book is mainly aimed at the professional engineer, designer and architect who wants to apply solar energy for heating or cooling of buildings. In this respect the book contains many useful diagrams and tables giving practical information for the design of systems. This book is particularly aimed at application by engineers in the U.S.A. This means that SI-units are not used and that extensive solar insolation and weather data give US data only. Also the economic evaluations hold for US conditions. However the general principles are clearly explained and can be easily adapted by the engineers in other countries. It means that some of the conclusions, like on the optimal number of collector covers should be considered for each case separately by a designer.

The book covers all relevant material for solar heating systems. Of course not all aspects could be covered in detail, many useful references help the reader to find more detailed information on special subjects. Attention is given to flat-plate collectors mainly but also optical concentration is touched upon. As an appendix the proposed US standard method of testing and rating of flat plate collectors is included. This is very useful as the engineers should realise that much confusion on the performance of collectors occurs due to different test methods.

The calculation of the heat requirement of a building as well as the possibilities of heat storage are discussed The book brings these parts together in a discussion on system evaluation. Computerised system optimization including the economic factors is well covered. The book also goes into the legal implications of solar energy use.

A chapter on solar cooling of buildings presents the possibilities of solar energy in this field. Necessarily this subject is treated less extensively as the solar heating of buildings. This would have required a too detailed coverage of cooling technology.

A research scientist working in the field of thermal conversion of solar energy will miss a fundamental coverage of radiation properties and heat transfer of solar collectors. New developments like vacuum-collectors, new spectral selective surfaces and honeycombs to suppress convection are not or only slightly discussed. However this book aims at the designer of to-day and for him this is a well organized book giving easy access to all information on solar heating and cooling systems that he may require.

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Steam and Air Tables in SI Units, edited by THOMAS F. IRVINE JR. and JAMES P. HARTNETT. Hemisphere, Washington, U.S.A. (1975) 120 pp.

APPROXIMATELY two-thirds of this 120-page set of Tables is taken up by the properties of steam. There are also tables on ammonia, Freon 11 and mercury in addition to those on steam and air. Accompanying the Tables is a Mollier chart for steam

Although intended primarily for student use, the steam tables appear to be more detailed than would be necessary for that purpose. The authors state that they have ultimate industrial use also in mind as the United States becomes more committed to SI units. Hence the need for these steam tables in that country presumably arises from the fact that, unlike other countries at the time, only tables in British units were published there following the appearance in 1967 of the internationally agreed IFC Formulation for Industrial Use. The Mollier chart accompanying the Tables was obtained from what is described as an International Edition of Steam Tables published in Germany in 1969; however, those tables did not receive the official international imprimatur that has been accorded by the International Association for the Properties of Steam to the IFC Formulation from which the tabulated values were computed. The sources of other data in the Tables under review are not listed.

In most of the tables, the unit used for tabulation of pressures is the bar. In two of the tables tabulation is in terms of the technical atmosphere, which is not an SI unit, while the conversion tables list the normal atmosphere; a correction slip draws attention to this unfortunate circumstance. The unit symbols used in the Tables are not always in accordance with accepted international standards, while the term "molecular weight" is used where molar mass is listed and the ratio of the specific heat capacities is erroneously described as the "adiabatic exponent"

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