BOOKS

Steam and Air Tables in SI Units, edited by T. F. Irvine, Jr., and J. P. Hartnett, ix + 127 pages and chart, paperback, Hemisphere Publishing Company (1976) $5.85.

With the inevitability of the metric system now apparent, this work of Irvine and Hartnett will be a useful set of tables to many, including students, academicians who have to teach those students, and certainly a not small portion of the industrial sector. The tables cover steam (both thermodynamic and transport properties), air, ammonia, Freon 11, moist air, and mercury, the last four under conditions only of saturation. The serious worker who needs steam tables will probably prefer the more comprehensive presentation of Keenan et al., with its wealth of equations. Otherwise, this present set of tables should prove a time-saver to many, as it eliminates bothersome interpolations and conversions.

The compilation seems especially appropriate as an accompaniment to a course in classical thermodynamics, where there is presently a lack of texts that make a full commitment to SI units.

A feature of these tables worth noting is the inclusion of a set of conversion tables. The unit *bar* is used for pressure rather than the more awkward *kilopascal* that appears in some international publications. A very fine removable Mollier chart for steam is included. On the other hand, there is no information on compressed (subcooled) water. In the air tables the listing s, where

$$s = \int_o^T \frac{C_p}{T}\, dT = s(T) \text{ only}$$

is labeled *entropy*, which could confuse the uninitiated student.

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Solar Heating and Cooling, Jan F. Kreider and Frank Kreith, Hemisphere Publishing Corporation and McGraw-Hill Book Company (1976), 338 pages, $22.50.

This newest in a series of books on the application of solar energy to building climate control is written in text book style. After a brief introduction dealing with the reasons for the resurgence of interest in solar heating technology, the authors dive into a fast review of the fundamentals of heat transfer, covering such items as the computation of heat losses from buildings and seasonal variations in the solar flux at the earth's surface. A separate chapter is devoted to design concepts and methods of assessing the performance characteristics of solar collectors, with considerable emphasis being given to concentrating designs. In a chapter on solar space heating and water heating, design "optimization" rules are given for the sizes and types of solar collectors and the volume of thermal storage. The authors introduce the important concept of an economic analysis based on life-cycle costing as a method of determining the most cost-effective design. The final chapter deals with the technology of solar cooling devices, including the absorption chiller, the "solar assisted" heat pump, the Rankine power system, and several nonmechanical cooling systems. In the spirit of giving the text the flavor of a handbook, the last 45 percent of the book contains appendices, including such topics as the NBS solar collector test procedure, calculation methods for determining surface radiation properties, and a checklist of energy conservation procedures, in addition to providing numerous tables of weather data, material property data, and interest data.

The stated objective of the book is to "provide the architect, engineer, and builder with the tools required to design and construct properly engineered heating and cooling systems." To achieve this objective, the authors have provided rules of thumb and discussions of the merits and demerits of various system design approaches. It is the reviewer's opinion that the authors fail to achieve their objective. Many of the costing data used in the book appear unrealistically low, leading to sizing conclusions which are questionable. Not enough discussion is provided on the relationship between the system function (for example, hot water) and the type of collector that would be appropriate. Nor is much attention given to the various design approaches possible for dealing with such practical problems as freeze protection, corrosion, and contamination of service hot water.

On the whole, the book reads well and would serve as a useful introduction to the subject of design for the solar heating and cooling of buildings.

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Filtration Post-Treatment Processes, Richard J. Wakeman, American Elsevier Publishing Company, New York, 1975, $18.75.

This book is concerned with a very specialized subject. Filtration post-treatment processes are defined as those operations which are applied upon completion of the filtration cycle for the recovery of valuable filtrates or the reduction of the moisture contents of filter cakes. The topics included are dewatering and washing of filter cake, reslurry washing, and backwashing for deep-bed filtration. The last two topics however are treated rather briefly.

For the discussion of dewatering and washing of filter cake, the author begins with a simple but adequate introduction of two-phase flow in porous media. The phenomenon of dewatering is discussed with the use of the film drainage model, and comparisons between theory and experimental data are presented. This is perhaps the best part of the book insofar as the organization and presentation of the materials are concerned. Another interesting feature of this book is the chapter on cake cracking. Criteria of cake surface cracking in terms of cake saturation and material characteristics of cake are developed. Dr. Wakeman is to be congratulated on this account, because, traditionally, chemical engineers often overlook the importance of the mechanical properties of the filter cake in the study of cake filtration. The chapters on washing are somewhat uneven. The emphasis is almost exclusively on the role of diffusion in cake washing. The other method, filtrate displacement by washing liquid, is barely mentioned. It is suprising that the author failed to include more materials on this topic since filtrate dis-