16 **Vavra M. H.** Basic elements for advanced design of radial flow compressors. *AGARD Lecture notes 39 Advanced Compressors, Von Karman Institute, Brussels, 1–4 June 1970*

17 **Bammert K., Rautemberg M. and Wittekindt W.** Matching of turbocomponents described by the example of impeller and diffuser in a centrifugal compressor. *J. Eng. for Power*, **102**, *July 1980*

18 **Mashimo T. et al.** On the performance prediction of a centrifugal compressor scaled up. *ASME paper 82-GT-112, 1982*

19 **Japikse D.** Design optimization and performance map prediction for centrifugal compressors and radial inflow turbines. *AGARD L.S.83, June 1976*

20 **Dean R. C.** The fluid dynamic design of advanced centrifugal compressors. *Lecture notes 50, Advanced Radial Compressors. Von Karman Institute, Brussels, May 1975*

21 **Jansen W.** Steady fluid flow in a radial vaneless diffuser. *ASME paper 63-WA-12, 1963*

22 **Japikse D.** Life evaluation of advanced turbomachinery. *LS. on turbine blade cooling, Von Karman Institute, Jan. 1976*

# BOOK REVIEW

## Fluidized Bed Combustion and Applied Technology

Ed. R. G. Schwieger

This book contains 36 papers presented at the First International Fluidized Bed Combustion (FBC) Symposium held in Beijing, People's Republic of China (PRC) in August 1983. It has about 600 pages and more than 400 tables, charts, diagrams and photographs are supplied on the topics covered. Most of the papers are from PRC and USA. However, samples of work accomplished in 9 countries (Belgium, Canada, Denmark, UK, France, West Germany, Japan, Netherlands and Sweden) by industry, government research institutions and universities are also included.

The book is divided into five sections: overview, theory, design and development, environmental considerations, and operating data. Important aspects of fluidized bed combustion are touched upon in these sections. Some of the topics included are: a review of the state-of-the-art, combustion phenomena, heat transfer, modelling, pollution control and erosion of tubes in the bed. Atmospheric and pressurised fluidized bed combustion are discussed. Operations with low quality fuels such as oil shale, process char, extremely poor grades of coal and regular coal are described.

One of the attractive features of the book is that it contains extensive information on the experience of PRC in the area of fluidized bed combustion. Fluidized bed combustors and boilers have been used in PRC for the last 20 years to produce industrial steam and electricity. These units are locally built and run by average factory workers after a short training period. The experimental data and information on this experience should be valuable to industries manufacturing small combustors burning coal or other solid fuels, as well as to industries who are considering installing fluidized bed combustors in their facilities. There are also large amounts of data obtained from small and large units operating in other countries participating in the symposium. Empirical relations important for design purposes are given.

The book is an important source of information and a good reference for industry using or manufacturing combustors, and for researchers working in this or related areas in universities and government research institutions.

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### Books received

Computational Fluid Mechanics and Heat Transfer, *D. A. Anderson, J. C. Tannehill and R. H. Pletcher*, $39.95, pp 599, Hemisphere

Perturbation Methods in Heat Transfer, *A. Aziz and T. Y. Na*, $37.50, pp 199, Hemisphere/Springer-Verlag

Steam tables (in SI-units) Wasserdampftafeln, *eds U. Grigull, J. Straub and P. Schiebener*, pp 94, DM 26, Springer-Verlag

*Contains tables and diagrams concerning the properties of water and steam for use by students and research and industrial engineers to solve problems in power and chemical engineering. Thermodynamic properties have been calculated according to the formulation by Haar, Gallagher and Kell, adopted in 1983 by the 'International Association for the Properties of Steam'.*

Steam tables, *eds L. Haar, J. S. Gallagher and G. S. Kell*, $34.50 (cloth), $14.95 (paper), pp 320, Hemisphere

Heat Exchanger Design Handbook, supplement 1, *eds E. U. Schlunder, K. J. Bell, D. Chisholm, V. Gnielinski, G. F. Hewitt, E. A. D. Saunders, F. W. Schmidt, D. B. Spalding, J. Taborek and A. Zukauskas*, pp 134, $115.00, Hemisphere/Springer-Verlag

*Supplement 1 adds new technical data to the core handbook and includes: rules, practices and conversion charts; regeneration and thermal energy storage; waste heat boiler systems; fouling in heat exchangers; and properties of liquid heavy water.*

Inclusion of a title in this section does not necessarily preclude subsequent review.