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Book review

Handbook of Industrial Mixing, Science and Practice, E.L. Paul, V.A. Atiemo-Obeng, S.M. Kresta (Eds.), John Wiley & Sons, Hoboken, NJ, 2003, ISBN: 0-471-26919-0, Hardcover, 1440pp, USD 160.00

Mixing, the most common unit operation in the chemical and allied process industries, has now its own handbook. Sponsored by NAMF (the North American Mixing Forum of the AIChE), it has been written by well-known mixing specialists, from academia, industry and the consulting field. This team effort has resulted in a very complete reference book, nicely illustrated, which covers all aspects of mixing, from the fundamentals to the selection of equipment. It is the first treatise on this subject, and it directly answers to needs that have been long recognized by the practitioners and the novices.

The handbook is divided into 22 chapters that are not meant to be read in sequence, but rather used as a reference and a powerful tool to understand the main aspects of mixing. To ease the reading, the chapters have been grouped in such a way that one can focus on a given mixing topics, ignoring the other parts of the book. Most chapters are self-consistent with many references to help the reader developing further his knowledge. It starts with a refresher on the basic principles of residence time distributions and how to use this concept in chemical reactors analysis and design. This is followed by four chapters covering mixing fundamentals that is the fluid mechanics theory of mixing in the turbulent and laminar regimes, as well as the modern tools used to investigate mixing, namely experimental methods and computational fluid dynamics. Turbulent mixing focuses on time and length scales and where the energy is dissipated. The chapter on laminar mixing is much more theoretical based on dynamical systems approach. Five chapters are devoted to mixing equipment in tank or in line (pipeline mixing), including rotor–stator mixers, with a full chapter describing the mechanical design aspects and the vocabulary required to establish a constructive dialog between mixing process designers and the suppliers. Another chapter explains the role of the mixing equipment supplier.

Mixing is mainly concerned in bringing together different phases for a given process objective. All the classical cases are considered in the handbook: blending, liquid–liquid, gas–liquid and solid–liquid. Viscous mixing and solid mixing are also described in separate chapters, a welcome contribution in a rapid developing field. Heat transfer and chemical reactions are also presented, along with their applications in the pharmaceutical industries and the bioindustries. Two chapters are concerned with the applications of mixing in the paper industry and the petroleum industry. Last but not least, a CD-ROM is provided that illustrates the main mixing flow phenomena presented in the book.

In summary, this handbook on industrial mixing is definitely worth buying. It is a very complete book on a subject that has gained much respect in modern chemical processing. It can also be considered as an example for other fields of chemical engineering, according to the fact that it brings to chemical engineering the more recent progress in metrology, CFD aspects, modern industrial applications... It contributes to enlarge the frontiers of chemical engineering.

In short, a very nice addition to the chemical engineering literature.

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