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DICTIONARY OF Chemical Engineering

CARL SCHASCHKE

A Dictionary of
**Chemical
Engineering**

Professor Carl Schaschke is a chemical engineer having worked first at BNFL at Sellafield in Cumbria. After then completing a PhD, his academic career began at Napier University. He is currently professor at the University of Strathclyde. He has had several secondments including to the Fawley oil refinery and BBC TV's *Tomorrow's World*. His teaching and research interests include chemical engineering applications under extreme conditions. He is a Fellow of IChemE and UK representative of the EFCE Working Party on High Pressure Technology. He is married with two daughters, Emily and Rebecca.



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Chemical Engineering

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Preface

The purpose of this dictionary is to provide a quick, useful, and comprehensive reference to commonly used and, in some case, less commonly used terms from the field of chemical engineering. As with any dictionary, it is intended to provide definitions to words; it is not merely a brief glossary of terms, nor is it intended to be encyclopedic, with lengthy and overly long explanations. It is aimed at students at school and undergraduate students who will encounter, perhaps for the first time, unfamiliar technical terms. It is also aimed at postgraduates engaged in chemical engineering research as well as practitioners of chemical engineering in industry who may require clarification regarding terms. This dictionary is also aimed at the general reader who in the course of their work or daily lives may encounter unfamiliar terms.

The focus of the dictionary is scientific and engineering terms. It includes core and fundamental terms commonly encountered across all degree programmes of chemical engineering worldwide. It includes many scientific and engineering concepts, laws, theories, and hypotheses. It includes significant organizations, international legislation, and biographical notes of influential scientists and engineers who have contributed to the development of the discipline. There are definitions of many types of specialist process equipment encountered in chemical engineering. This dictionary should therefore enable the reader to distinguish between a lute and a dead leg or a Hortonsphere and a holley-mott. Being a diverse discipline, there is an emphasis on established processes across a wide range of industries spanning nuclear, mineral, oil and gas, food, and pharmaceutical processing. Some older or former processes are also included where their usage was pioneering at the time or influenced later processes. Products, raw materials, and feedstocks are included, though to a far lesser extent; only those upon which major industries are based, such as crude oil, natural gas, minerals, and ores, are included. The full details of chemicals and their properties are included in the sister dictionaries such as the *Oxford Dictionary of Chemistry*.

As a branch of engineering in its own right, the roots of chemical engineering extend back to the nineteenth century. While many of the original and familiar terms are still in use today (such as *unit operations* attributed to Arthur D. Little), chemical engineering in the twenty-first century has expanded considerably and diversified into many new technological fields such as renewable energies, nanotechnology, and biomolecular engineering. Many students and professional engineers alike encounter new terms almost daily with which they may not be familiar or entirely clear. This dictionary therefore aims to provide up-to-date, clear, concise terms and definitions, and other useful and valuable information that can be used as a quick reference source.

The dictionary features over 3,000 of the most commonly encountered terms, although the number actually used by chemical engineers is far greater! There are many cases where words are used uniquely within a particular industry, or within a single industrial organization, and are not be found anywhere else. These have not been included. In providing a definition of each of the included words, the aim has been to be inclusive of all aspects of chemical engineering without being too general. If one starts with the very name *chemical engineering*, there are no doubt as many definitions as chemical engineers! Founding member of the Institution of Chemical Engineers Norman Swindin once described chemical engineering as *engineering without wheels*. An amusing definition but it falls a long way short of being helpful or informative.

The SI system of units has been used throughout although it is recognized that British Imperial and American customary units are still widely used in many industries. Reference has been made to commonly encountered units and conversions presented where appropriate.

In the preparation of this dictionary, I am indebted to many people who have assisted in suggesting words, their comments and corrections. Any errors, omissions, misprints, or obscurities are entirely my own. My thanks to the editorial staff of Oxford University Press and in particular Judith Wilson, Jamie Crowther, and Clare Jones, as well as thanks to the copy-editor, Marilyn Inglis, and the proofreader, Sarah Chatwin, for their attentive and invaluable work. Finally, this book could not have been produced without the support of my wife Melodie and my daughters Emily and Rebecca.

Carl Schaschke