

# Elements Of Fuels Furnaces And Refractories

## By O P Gupta

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**Elements of Petroleum Refinery**

**Engineering** O.P. Gupta 2015 This book is targeted to benefit the diploma in

engineering students. Degree in engineering students (B.Tech-Chemical Engineering, Petroleum Engineering, Petrochemical Engineering, Aeronautical Engg., AMIE, AMIICHE, students etc. M. Tech students of various disciplines pursuing courses on petroleum refining. Faculty members/teaching staff of engineering college/IIT's/NIT's etc. Practicing petroleum engineers/consultants/refiners in various private sector/public sector undertakings, state/central government departments, NGO's etc. Students of foreign universities of developing countries pursuing diploma/degree/postgraduate courses in various engineering disciplines having a paper in petroleum refinery engineering. Boilers Kumar Rayaprolu 2012-11-20 Following the publication of the author's first book, Boilers for Power and Process by CRC Press in 2009, several requests were made for a reference with even quicker access to

information. Boilers: A Practical Reference is the result of those requests, providing a user-friendly encyclopedic format with more than 500 entries and nearly the same number of supporting illustrations. Written for practicing engineers and dealing with practical issues rather than theory, this reference focuses exclusively on water tube boilers found in process industries and power plants. It provides broad explanations for the following topics: A range of boilers and main auxiliaries, as well as steam and gas turbines Traditional firing techniques—grates, oil/gas, and modern systems Industrial, utility, waste heat, MSW and bio-fuel-fired boilers, including supercritical boilers The scientific fundamentals of combustion, heat transfer, fluid flow, and more The basics of fuels, water, ash, high-temperature steels, structurals, refractory, insulation, and more Additional engineering topics like boiler

instruments, controls, welding, corrosion, and wear Air pollution, its abatement techniques and their effect on the design of boilers and auxiliaries Emerging technologies such as carbon capture, oxy-fuel combustion, and PFBC This reference covers almost every topic needed by boiler engineers in process and power plants. An encyclopedia by design and a professional reference book by focus and size, this volume is strong on fundamentals and design aspects as well as practical content. The scope and easy-to-navigate presentation of the material plus the numerous illustrations make this a unique reference for busy design, project, operation, and consulting engineers.

**Refractories Handbook** Charles Schacht 2004-08-11 This comprehensive reference details the technical, chemical, and mechanical aspects of high-temperature refractory composite materials for step-by-

step guidance on the selection of the most appropriate system for specific manufacturing processes. The book surveys a wide range of lining system geometries and material combinations and covers a broad

**Handbook on Energy Audit and Environment Management** Y. P. Abbi 2006-01-01 Released on 24 Aug 2006, by Shri Sushil Kumar Shinde, Hon'ble Union Minister of Power, Govt. of India, the handbook presents a detailed account of energy conservation and environmental management in small, medium as well as large enterprises. It is a must-read for every professional interested in energy management and auditing.

**Elements of Fuels, Furnaces and Refractories** Om Prakash Gupta 1997 [Fuels and Combustion](#) Samir Sarkar 2010-01-21 Fuels and Combustion is a systematic and comprehensive work on a

subject that forms an integral part of the undergraduate degree courses in chemical, mechanical, metallurgical, and aeronautical engineering. While emphasizing the fundamental principles, the book provides a balanced treatment of energy resources, processing of fuels, fundamentals of combustion, and combustion appliances. The book takes a different approach by dealing with the topics in an Indian context. The third edition of the book has a completely new introduction, layout, and design, and new statistics have been added to provide up-to-date information.

**Refractories Book** Laclede-Christy Company 1919

**Fuels, Furnaces, and Refractories** James Duncan Gilchrist 1977

Chemical Metallurgy Chiranjib Kumar Gupta 2006-03-06 Chemical metallurgy is a well founded and fascinating branch of the wide field of metallurgy. This book provides

detailed information on both the first steps of separation of desirable minerals and the subsequent mineral processing operations. The complex chemical processes of extracting various elements through hydrometallurgical, pyrometallurgical or electrometallurgical operations are explained. In the choice of material for this work, the author made good use of the synergy of scientific principles and industrial practices, offering the much needed and hitherto unavailable combination of detailed treatises on both compiled in one book.

*70th Conference on Glass Problems* Charles H. Drummond, III 2010-07-02 This issue contains a collection of papers presented at the 70th Conference on Glass Problems at The Ohio State University, Columbus, Ohio. Topics include melting and molding, refractories, and environmental issues and new products.

**Principles of Blast Furnace Ironmaking**

Anil Kumar Biswas 1981

Nanoscale Materials Luis M. Liz-Marzán  
2007-05-08 Organized nanoassemblies of inorganic nanoparticles and organic molecules are building blocks of nanodevices, whether they are designed to perform molecular level computing, sense the environment or improve the catalytic properties of a material. The key to creation of these hybrid nanostructures lies in understanding the chemistry at a fundamental level. This book serves as a reference book for researchers by providing fundamental understanding of many nanoscopic materials.

**Encyclopedia of Glass Science, Technology, History, and Culture Two Volume Set** Pascal Richet 2021-02-05 This

Encyclopedia begins with an introduction summarizing its scope and content. Glassmaking; Structure of Glass, Glass Physics, Transport Properties,

Chemistry of Glass, Glass and Light, Inorganic Glass Families, Organic Glasses, Glass and the Environment, Historical and Economical Aspect of Glassmaking, History of Glass, Glass and Art, and outline possible new developments and uses as presented by the best known people in the field (C.A. Angell, for example). Sections and chapters are arranged in a logical order to ensure overall consistency and avoid useless repetitions. All sections are introduced by a brief introduction and attractive illustration. Newly investigated topics will be addressed, with the goal of ensuring that this Encyclopedia remains a reference work for years to come.

**FUELS, FURNACES AND REFRACTORIES**  
GUPTA, R. C 2016-01-02 Written in a student-friendly manner, the book begins with the introduction to fuels, furnaces and refractories. It further exposes the reader to the different types of fuels with their testing

methods. Besides covering the recent developments in the field of non-recovery coke ovens, dry coke cooling, use of coal in DRI and blast furnace, and new energy recovery system, the book also covers all the aspects of refractory systems. For better understanding of the text, the book includes a large number of illustrations. The book also facilitates a thorough understanding of different environmental issues associated with the use of fuel. Finally, the reader is made familiar with the Indian industrial scenario regarding fuels, furnaces and refractories.

**Proceedings of the Unified International Technical Conference on Refractories (UNITECR 2013)** Dana Goski 2014-02-10 Proceedings containing 231 manuscripts that were submitted and approved for the 13th biennial worldwide refractories congress recognized as the Unified International Technical Conference

on Refractories(UNITECR), held September 10-13, 2013.

**Refractories for the Chemical Industries** Prasunjit Sengupta 2020-11-28 The book provides process engineers, an insight into refractories focusing on its importance and requirements in chemical process industries such as refinery and petrochemicals, syngas manufacturing, coal gasification, limestone calcinations, carbon black, glass, and cement production. Additionally the book discusses the refractory requirements for the CFBC boiler, and waste heat utilization process to generate steam. The book describes characterization of refractory material and selection process of the refractory for lining different equipments pertaining to the chemical process industry. The book covers refractory installation techniques, and the precautions to be taken during installation are discussed in detail along with the

theoretical background. It explains the physical and chemical factors that influence the performances of refractory, mechanism of its degradation in service and emphasizes on the thermo-chemical and thermo-mechanical aspects and their role in that process . The content lays out different methods of monitoring Refractory lining conditions while the furnace is in operation and also elucidates few methods to repair the worn out lining without taking a shutdown. The scheme of investigation of a refractory failure is an added feature.

*Boilers and Burners* Prabir Basu 2012-12-06

A joint effort of three continents, this book is about rational utilization of the fossil fuels for generation of heat or power. It provides a synthesis of two scientific traditions: the high-performance, but often proprietary, Western designs, and the elaborate national standards based on less advanced Eastern designs; it presents both in the same

Western format. It is intended for engineers and advanced undergraduate and graduate students with an interest in steam power plants, burners, or furnaces. The text uses a format of practice based on theory: each chapter begins with an explanation of a process, with basic theory developed from first principles; then empirical relationships are presented and, finally, design methods are explained by worked out examples. It will thus provide researchers with a resource for applications of theory to practice. Plant operators will find solutions to and explanations of many of their daily operational problems. Designers will find this book ready with required data, design methods and equations. Finally, consultants will find it very useful for design evaluation.

**Industrial and Process Furnaces** Barrie Jenkins 2013-10-23 Furnaces sit at the core of all branches of manufacture and industry, so it is vital that these are designed and

operated safely and efficiently. This reference provides all of the furnace theory needed to ensure that this can be executed successfully on an industrial scale. *Industrial and Process Furnaces: Principles, 2nd Edition* provides comprehensive coverage of all aspects of furnace operation and design, including topics essential for process engineers and operators to better understand furnaces. This includes: the combustion process and its control, furnace fuels, efficiency, burner design and selection, aerodynamics, heat release profiles, furnace atmosphere, safety and emissions. These elements and more are brought together to illustrate how to achieve optimum design and operation, with real-world case studies to showcase their application. Up-to-date and comprehensive reference encompassing not only best practice of operation but the essential elements of furnace theory and design,

essential to anyone working with furnaces, ovens and combustion-based systems. More case studies, more worked examples. New material in this second edition includes further application of Computational Fluid Dynamics (CFD), with additional content on flames and burners, costs, efficiencies and future trends.

*Energy Efficiency Guide for Industry in Asia 2006* This guide has been developed for Asian companies who want to improve energy efficiency through Cleaner Production and for stakeholders who want to help them. It includes a methodology, case studies for more than 40 Asian companies in 5 industry sectors, technical information for 25 energy equipments, training materials, a contact and information database.-- Publisher's description.

### **Elements of Fuel & Combustion**

**Technology** O.P. Gupta This book contains detailed description of solid, liquid, gaseous

fuels, combustion and furnaces. Beside short questions and answers and multiple choice questions & answers and multiple choice questions; answers drawn from the examination papers of various engineering Colleges and professional bodies examinations are also included. The book will be useful for degree & diploma curriculum of various branches of Engineering and for various associate membership examinations conducted by professional bodies like Institution of Engineers (AMIE), Indian Institute of Metals (AMIIM), Indian Institute of Chemical Engineers (AMIEChE), Institute of Chemicals etc.

*Refractories for Aluminium* Andrey Yurkov 2014-12-15 This book details the peculiarities of the requirements for refractories designed for aluminium metallurgical process: reduction, cast house, and anode production. The author describes

requirements specific to the properties and structure of refractory materials that differentiate it from the refractories for ferrous metallurgy and other refractories. A comparison is drawn between the properties and structure of refractories and carbon cathode materials from different points of view: from the point of physical chemistry and chemistry interactions during the metallurgical process and from the point of design of reduction pots and furnaces with the aspect to the service life time of metallurgical aggregates.

### **Khanna's Multichoice Questions & Answers in Metallurgical Engineering**

O.P. Gupta 2017 This book is meant for diploma & degree student of metallurgical engineering for their academic programs as well as for various competitive examination for securing jobs. This book has been structured in three section. First section contains multiple choice type questions of

various subjects of metallurgical engineering. Second section contains chapter wise question of GATE (Graduate Aptitude Test in Engineering) from 1991 to 2016. Third section contains SHORT QUESTIONS & ANSWERS in METALLURGICAL ENGINEERING. Fourth section contains APPENDICES containing Glossary of terms related to Metallurgical Engineering and Q&A of GATE-2017. This book has been designed to serve as "Hand Book of Metallurgical Engineering" which will be useful for various competitive examinations for recruitment in various public sector & Private Sector companies as well as for GATE Examination. Question have been arranged subject wise and answers are given at the bottom of the page.

**Practical Guide to Industrial Boiler Systems** Ralph Vandagriff 2001-04-18 This volume covers the fundamentals of boiler systems and gathers hard-to-find facts and

observations for designing, constructing and operating industrial power plants in the United States and overseas. It contains formulas and spreadsheets outlining combustion points of natural gas, oil and solid fuel beds. It also includes a boiler operator's training guide, maintenance examples, and a checklist for troubleshooting.

Combustion and Gasification in Fluidized Beds Prabir Basu 2006-02-17 Besides being one of the best Clean Coal Technologies, fluidized beds are also proving to be the most practical option for biomass conversion. Although the technology is well established, the field lacks a comprehensive guide to the design and operating principles of fluidized bed boilers and gasifiers. With more than 30 years of research and industrial experience, Prabir Basu answers this pressing need with Combustion and Gasification in Fluidized Beds. This book is a

versatile resource that explains how fluidized bed equipment works and how to use the basic principles of thermodynamics and fluid mechanics in design while providing insight into planning new projects, troubleshooting existing equipment, and appreciating the capabilities and limitations of the process. From hydrodynamics to construction and maintenance, the author covers all of the essential information needed to understand, design, operate, and maintain a complete fluidized bed system. It is a must for clean coal technology as well as for biomass power generation. Beginning with a general introduction to fossil or biofuel conversion choices, the book surveys hydrodynamics, fundamentals of gasification, combustion of solid fuels, pollution aspects including climate change mitigation, heat transfer in fluidized beds, the design and operation of bubbling and circulating fluidized bed boilers, and various

supporting components such as distributor grates, feeding systems, and gas-solid separators.

*Industrial Combustion Pollution and Control* Jr., Charles E. Baukal 2003-10-15 This reference overflows with an abundance of experimental techniques, simulation strategies, and practical applications useful in the control of pollutants generated by combustion processes in the metals, minerals, chemical, petrochemical, waste, incineration, paper, glass, and foods industries. The book assists engineers as they attempt to meet e

**Fuels, Furnaces and Refractories** J. D. Gilchrist 2013-10-22 *Fuels, Furnaces and Refractories* focuses on the sources and efficient use of energy available to modern industry. This book begins with the classification, properties, tests, and different kinds of fuels, as well as trends in fuel utilization. This text also tackles the

generation and distribution of electricity from both chemical and nuclear energy sources. Subsequent chapters focus on the thermodynamics, physics, chemistry, and kinetics of combustion of fuels; the burner design; the heat transfer and flow of gases through furnaces and flues; and ways of controlling energy supply rates and temperatures. The refractory materials, which are heat-resisting substances, are also described.

*Aluminum Recycling, Second Edition* Mark E. Schlesinger 2013-12-21 What makes this book unique is a specific focus on aluminum recovery, rather than just recycling in general. It also offers an integrated discussion of scrap recovery and re-melting operations and includes economic as well as technical elements of recycling. Important topics include a discussion of the scrap aluminum marketplace and how secondary aluminum is collected and sorted, the

design and operation of furnaces for melting scrap, the refining of molten aluminum, and the recovery and processing of dross from re-melting operations. This second edition features more information on aluminum scrap pricing and the economics of recycling, the analysis of dross processing methods currently in use by the industry, and drosses produced. The book has been updated throughout to include the most up-to-date information.

PHYSICAL METALLURGY: PRINCIPLES AND PRACTICE, Third Edition RAGHAVAN, V. 2015-11-10 This well-established book, now in its Third Edition, presents the principles and applications of engineering metals and alloys in a highly readable form. This new edition retains all the basic topics covered in earlier editions such as phase diagrams, phase transformations, heat treatment of steels and nonferrous alloys, shape memory alloys, solidification, fatigue, fracture and

corrosion, as well as applications of engineering alloys. A new chapter on 'Nanomaterials' has been added (Chapter 8). The field of nano-materials is interdisciplinary in nature, covering many disciplines including physical metallurgy. Intended as a text for undergraduate courses in Metallurgical and Materials Engineering, the book is also suitable for students preparing for associate membership examination of the Indian Institute of Metals (AMIIM) and other professional examinations like AMIE.

**Fuels, Furnaces, Refractories and Pyrometry** A V K Suryanarayana 2015-10

Present day technology is vibrant and changing rapidly. But the essential characteristics remain the same; when a fuel is burnt, the aim will always be to completely burn it and derive maximum heat out of it. A furnace and its refractory linings are must to utilize the fuel. When the

fuel is burnt and some process(s) are performed in the furnace, it becomes a consequential necessity to measure the temperature in the furnace, to have a proper control over the operations. An effort is made to give the students a deep insight into the utilization of fuels, with some fundamentals, essential to have a grasp of the subject. This book thus tries to encompass the fuel utilization to a satisfactory level. Salient features - Units are converted to S.I. Units from CGS or FPS systems - More material is added in Nuclear and Solar Energy topics

**TMS 2019 148th Annual Meeting & Exhibition Supplemental Proceedings & The Minerals, Metals Materials Society** 2019-02-26 This collection features papers presented at the 148th Annual Meeting & Exhibition of The Minerals, Metals & Materials Society.

**Light Metals 2020** Alan Tomsett

2020-01-28 The Light Metals symposia at the TMS Annual Meeting & Exhibition present the most recent developments, discoveries, and practices in primary aluminum science and technology. The annual Light Metals volume has become the definitive reference in the field of aluminum production and related light metal technologies. The 2020 collection includes papers from the following symposia: • Alumina and Bauxite • Aluminum Alloys, Processing and Characterization • Aluminum Reduction Technology • Cast Shop Technology • Cast Shop Technology: Recycling and Sustainability Joint Session • Electrode Technology for Aluminum Production

**Incineration Technologies** Alfons Buekens 2013-01-04 Waste incineration is the art of completely combusting waste, while maintaining or reducing emission levels below current emission standards.

Where possible, objectives include the recovering of energy as well as the combustion residues. Successful waste incineration makes it possible to achieve a deep reduction in waste volume, obtain a compact and sterile residue, and eliminate a wide array of pollutants. This book places waste incineration within the wider context of waste management, and demonstrates that, in contrast to landfills and composting, waste incineration can eliminate objectionable and hazardous properties such as flammability and toxicity, result in a significant reduction in volume, and destroy gaseous and liquid waste streams leaving little or no residues beyond those linked to flue gas neutralization and treatment. Moreover, waste incineration sterilizes and destroys putrescible matter, and produces usable heat. Incineration Technologies first appeared as a peer-reviewed contribution to the Encyclopedia of Sustainability Science

and Technology. It provides detailed treatment of the challenges of this technically complex process, which requires huge investment and operating costs, as well as good technical skills in maintenance and plant operation. Particular attention is paid to technologies for ensuring the complete burn-out of flue gas and residues and for controlling the resulting pollutants. Fuels and Fuel Technology Wilfrid Francis 2016-01-22 Fuels and Fuel Technology, Volume One: A Summarized Manual provides information pertinent to the fundamental aspects of fuels and fuel technology. This book presents a reasonably accurate summary of the existing knowledge and literature relating to fuel technology. Organized into two sections encompassing 72 data sheets, this volume begins with an overview of fuels as organic combustible substances used mainly or solely for the production of useful heat that

are divided into three classes, namely, solid, liquid, and gaseous fuels. This text then examines the main chemical components of wood. This book discusses as well the commercial production of peat. The final section deals with the calculations of theoretical and actual air requirements, dry and wet flue gases, and carbon dioxide in flue gases. This book is a valuable resource for chemists and fuel technologists. Students who are interested to obtain a qualification in the subject of fuels or fuel technology will also find this book useful. *Elements of Fuel & Combustion Technology* O.P. Gupta This book contains detailed description of solid, liquid, gaseous fuels, combustion and furnaces. Beside short questions and answers and multiple choice questions & answers and multiple choice questions; answers drawn from the examination papers of various engineering Colleges and professional bodies

examinations are also included. The book will be useful for degree & diploma curriculum of various branches of Engineering and for various associate membership examinations conducted by professional bodies like Institution of Engineers (AMIE), Indian Institute of Metals (AMIIM), Indian Institute of Chemical Engineers (AMIChE), Institute of Chemicals etc.

**Engineered Materials Handbook, Desk Edition** ASM International. Handbook Committee 1995-11 A comprehensive reference on the properties, selection, processing, and applications of the most widely used nonmetallic engineering materials. Section 1, General Information and Data, contains information applicable both to polymers and to ceramics and glasses. It includes an illustrated glossary, a collection of engineering tables and data, and a guide to materials selection. Sections

2 through 7 focus on polymeric materials-- plastics, elastomers, polymer-matrix composites, adhesives, and sealants--with the information largely updated and expanded from the first three volumes of the Engineered Materials Handbook. Ceramics and glasses are covered in Sections 8 through 12, also with updated and expanded information. Annotation copyright by Book News, Inc., Portland, OR Heat Treatment : Principles and Techniques T. V. Rajan 2011-01-01

*Extraction of Nonferrous Metals* Hem Shanker Ray 1985

### **IRON MAKING AND STEELMAKING**

AHINDRA GHOSH 2008-02-29 This authoritative account covers the entire spectrum from iron ore to finished steel. It begins by tracing the history of iron and steel production, right from the earlier days to today's world of oxygen steelmaking, electric steelmaking, secondary steelmaking

and continuous casting. The physicochemical fundamental concepts of chemical equilibrium, activity-composition relationships, and structure-properties of molten metals are introduced before going into details of transport phenomena, i.e. kinetics, mixing and mass transfer in ironmaking and steelmaking processes. Particular emphasis is laid on the understanding of the fundamental principles of the processes and their application to the optimisation of actual processes. Modern developments in blast furnaces, including modelling and process control are discussed along with an introduction to the alternative methods of ironmaking. In the area of steelmaking, BOF plant practice including pre-treatment of hot metal, metallurgical features of oxygen steelmaking processes, and their control form part of the book. It also covers basic open hearth, electric arc furnace and stainless steelmaking, before

discussing the area of casting of liquid steel—ingot casting, continuous casting and near net shape casting. The book concludes with a chapter on the status of the ironmaking and steelmaking in India. In line with the application of theoretical principles, several worked-out examples dealing with fundamental principles as applied to actual plant situations are presented. The book is primarily intended for undergraduate and postgraduate students of metallurgical engineering. It would also be immensely useful to researchers in the area of iron and steel.

*HEAT TRANSFER* DUTTA, BINAY K.

2000-01-01 This textbook is intended for courses in heat transfer for undergraduates, not only in chemical engineering and related disciplines of biochemical engineering and chemical technology, but also in mechanical engineering and production engineering. The author provides the reader with a very

thorough account of the fundamental principles and their applications to engineering practice, including a survey of the recent developments in heat transfer equipment. The three basic modes of heat transfer - conduction, convection and radiation - have been comprehensively analyzed and elucidated by solving a wide range of practical and design-oriented problems. A whole chapter has been devoted to explain the concept of the heat transfer coefficient to give a feel of its importance in tackling problems of convective heat transfer. The use of the

important heat transfer correlations has been illustrated with carefully selected examples.

**Industrial Burners Handbook** Jr., Charles E. Baukal 2003-10-29 Rapid development in the field precipitated by the increased demand for clean burner systems has made the Industrial Burners Handbook into the fields go-to resource. With this resource, bestselling author, editor, and combustion expert Charles Baukal, Jr. has put together a comprehensive reference dedicated to the design and applications of indust