

Steam Turbines And Gas Expanders Elliott Group

Please note that the content of this book primarily consists of articles available from Wikipedia or other free sources online. Pages: 38. Chapters: Air preheater, Axial compressor, Bimetallic strip, Cylinder (engine), Expander cycle (rocket), Gas turbine, Industrial fans, Jet engine, Mechanical fan, Mixed flow compressor, Moving bed heat exchanger, Plant efficiency, Recuperator, Sectional cooler. Excerpt: A gas turbine, also called a combustion turbine, is a type of internal combustion engine. It has an upstream rotating compressor coupled to a downstream turbine, and a combustion chamber in-between. The basic operation of the gas turbine is similar to the of the steam power plant except that air is used instead of water. Fresh atmospheric air flows through a compressor that brings it to higher pressure. Energy is then added by spraying fuel into the air and igniting it so the combustion generates a high-temperature flow. This high-temperature high-pressure gas enters a turbine, where it expands down to the exhaust pressure, producing a shaft work output in the process. The turbine shaft work is used to drive the compressor and other devices such as an electric generator that may be coupled to the shaft. The energy that is not used for shaft work comes out in the exhaust gases, so these have either a high temperature or a high velocity. The purpose of the gas turbine determines the design so that the most desirable energy form is maximized. Gas turbines are used to power aircrafts, trains, ships, electrical generators, or even tanks. Gases passing through an ideal gas turbine undergo three thermodynamic processes. These are isentropic compression, isobaric (constant pressure) combustion and isentropic expansion. Together, these make up the Brayton cycle. In a practical gas turbine, gases are first accelerated in either a centrifugal or axial compressor. These gases are then slowed using a diverging nozzle known as a diffuser; these processes increase the...

Over the past decade, the prospect of climate change resulting from anthropogenic CO₂ has become a matter of growing public concern. Not only is the reduction of CO₂ emissions extremely important, but keeping the cost at a manageable level is a prime priority for companies and the public, alike. The CO₂ capture project (CCP) came together with a common goal in mind: find a technological process to capture CO₂ emissions that is relatively low-cost and able to be expanded to industrial applications. The Carbon Dioxide Capture and Storage Project outlines the research and findings of all the participating companies and associations involved in the CCP. The final results of thousands of hours of research are outlined in the book, showing a successful achievement of the CCP's goals for lower cost CO₂ capture technology and furthering the safe, reliable option of geological storage. The Carbon Dioxide Capture and Storage Project is a valuable reference for any scientists, industrialists, government agencies, and companies interested in a safer, more cost-efficient response to the CO₂ crisis. *Succeeds in tackling the most important issues at the heart of the CO₂ crisis: lower-cost and safer solutions, and making the technology available at an industrial level. *Contains technical papers and findings of all researchers involved in the CO₂ capture and storage project (CCP) *Consolidates thousands of hours of research into a concise and valuable reference work, providing up-to-the minute information on CO₂ capture and underground storage alternatives.

Covers the timely topic of fuel cells and hydrogen-based energy from its fundamentals to practical applications Serves as a resource for practicing researchers and as a text in graduate-level programs Tackles crucial aspects in light of the new directions in the energy industry, in particular how to integrate fuel processing into contemporary systems like nuclear and gas power plants Includes homework-style problems

THE LATEST STEAM TURBINE BLADE DESIGN AND ANALYTICAL TECHNIQUES Blade Design and Analysis for Steam Turbines provides a concise reference for practicing engineers involved in the design, specification, and evaluation of industrial steam turbines, particularly critical process compressor drivers. A unified view of blade design concepts and techniques is presented. The book covers advances in modal analysis, fatigue and creep analysis, and aerodynamic theories, along with an overview of commonly used materials and manufacturing processes. This authoritative guide will aid in the design of powerful, efficient, and reliable turbines. COVERAGE INCLUDES: Performance fundamentals and blade loading determination Turbine blade construction, materials, and manufacture System of stress and damage mechanisms Fundamentals of vibration Damping concepts applicable to turbine blades Bladed disk systems Reliability evaluation for blade design Blade life assessment aspects Estimation of risk

A carefully selected compilation of the most relevant articles from the online edition of "ULLMANN's Encyclopedia of Industrial Chemistry", this three-volume handbook contains a wealth of information on energy sources, energy generation and storage, fossil and renewable fuels as well as the associated processing technology. Fossil as well as renewable fuels, nuclear technology, power generation and storage technologies are treated side by side, providing a unique overview of the entire global energy industry. New or updated articles include such classical topics as coal technologies, oil and gas, as well as cutting-edge technologies, such as biogas, thermoelectricity and solar technology. The result is an in-depth survey of industrial-scale energy technology.

A facility is only as efficient and profitable as the equipment that is in it: this highly influential book is a powerful resource for chemical, process, or plant engineers who need to select, design or configure plant successfully and profitably. It includes updated information on design methods for all standard equipment, with an emphasis on real-world process design and performance. The comprehensive and influential guide to the selection and design of a wide range of chemical process equipment, used by engineers globally • Copious examples of successful applications, with supporting schematics and data to illustrate the functioning and performance of equipment Revised edition, new material includes updated equipment cost data, liquid-solid and solid systems, and the latest information on membrane separation technology Provides equipment rating forms and manufacturers' data, worked examples, valuable shortcut methods,

rules of thumb, and equipment rating forms to demonstrate and support the design process Heavily illustrated with many line drawings and schematics to aid understanding, graphs and tables to illustrate performance data

Select low cost, high quality steam turbines quickly and easily A must for plant engineers looking to stay competitive in today's intense global marketplace., Heinz P. Bloch's Practical Guide to Steam Turbine Technology takes you step-by-step through the art of designing and selecting more reliable, cost-efficient turbomachinery. It includes everything you need to master steam turbine technology--from basic types and controls to the Elliot Shortcut selection method for multivalve, multistage systems. You get fingertip access to critical data on casing design. . .mechanical drive bearings. . .impulse and reaction turbine rotors. . .blade design. . .governors and control systems. . .couplings. . .rotor dynamics. . .reaction vs. impulse steam turbines. . .performance degradation. . .transmission elements. . .shortcut graphical selection methods. . .and more.

This Fertilizer Manual was prepared by the International Fertilizer Development Center (IFDC) as a joint project with the United Nations Industrial Development Organization (UNIDO). It is designed to replace the UN Fertilizer Manual published in 1967 and intended to be a reference source on fertilizer production technology and economics and fertilizer industry planning for developing countries. The aim of the new manual is to describe in clear, simple language all major fertilizer processes, their requirements, advantages and disadvantages and to show illustrative examples of economic evaluations. The manual is organized in five parts. Part I deals with the history of fertilizers, world outlook, the role of fertilizers in agriculture, and raw materials and includes a glossary of fertilizer-related terms. Part II covers the production and transportation of ammonia and all important nitrogen fertilizers-liquids and solids. Part III deals with the characteristics of phosphate rock, production of sulfuric and phosphoric acid, and all important phosphate fertilizers, including nitrophosphates and ammonium phosphates. Part IV deals with potash fertilizers-ore mining and refining and chemical manufacture; compound fertilizers; secondary and micronutrients; controlled-release fertilizers; and physical properties of fertilizers. Part V includes chapters on planning a fertilizer industry, pollution control, the economics of production of major fertilizer products and intermediates, and problems facing the world fertilizer industry.

This thoroughly updated edition of Fluid Catalytic Cracking Handbook provides practical information on the design, operation, troubleshooting, and optimization of fluid catalytic cracking (FCC) facilities. Based on the author's years of field experience, this expanded, second edition covers the latest technologies to improve the profitability and reliability of the FCC units, and provides several "no-to-low-cost" practical recommendations. A new chapter supplies valuable recommendations for debottlenecking and optimizing the performance of cat cracker operations.

First published: Chemical process equipment / Stanley M. Walas. 1988.

The latest design and manufacturing details in mechanical drive steam turbines Steam Turbines shows how to select, improve, operate, and maintain high-quality mechanical drive steam turbines-with maximum efficiency and minimum downtime. This new Second Edition offers authoritative information on the operating characteristics, design features, reliability, and maintenance of all steam turbines. A complete sourcebook, Steam Turbines delivers the expertise required to capitalize on the latest steam turbine and intermediate transmission unit innovations--and improve a plant's efficiency, availability, and profitability. Steam Turbines, Second Edition covers: Variable speed drives and intermediate gearing used for major process machinery and cogeneration drives-- with completely updated content Arrangement, material composition, and basic physical laws governing design of steam turbines How to select optimum configurations, controls, and components Options and ways to upgrade existing steam turbines

A modern reference to the principles, operation, and applications of the most important compressor types Thoroughly addressing process-related information and a wider variety of the major compressor types of interest to process plants, Compressors and Modern Process Applications uniquely covers the systematic linkage of fluid processing machinery to the processes they serve. This book is a highly practical resource for professionals responsible for purchasing, servicing, or operating compressors. It describes the main features of over 300 petrochemical and refining schematics and associated process descriptions involving compressors and expanders in modern industry. The organized presentation of this reference covers first the basics of compressors and what they are, and then progresses to important operational and process issues. It then explains the underlying principles, operating modes, selection issues, and major hardware elements for compressors. Topics include double-acting positive displacement compressors, rotary positive displacement compressors, understanding centrifugal process gas compressors, power transmission and advanced bearing technology, centrifugal compressor performance, gas processing and turbo-expander applications, and compressors typically found in petroleum refining and other petrochemical processes. Suitable for plant operation personnel, machinery engineering specialists, process engineers, as well as undergraduate students of this subject, this book's special features include: * Flow schematics of modern process units and processes used in gas transport, gas conditioning, petrochemical manufacture, and petroleum refining * Listings of licensors for each process on the flow schematics * Identification of each process flow schematic of compressors, cryogenic, and hot gas expanders at their respective locations * Important overview of surge control, estimating compressor performance, applications for air separation and gas processing plants, petroleum refinery issues, and important criteria that govern compressor selection and application Placing hundreds of associated process flow schematics at the fingertips of professionals and students, author and industry expert Heinz Bloch facilitates comprehension of the workings of various petrochemical, oil refining, and product upgrading processes that are served by compressors.

Blade Design and Analysis for Steam Turbines McGraw Hill Professional

Optimize plant asset safety and reliability while minimizing operating costs with this invaluable guide to the engineering, operation and maintenance of rotating equipment Based upon his multi-volume Rotating Equipment Handbooks, Forsthoffer's Best Practice Handbook for Rotating Machinery summarises, expands and updates the content from these previous books in a convenient all-in-one volume. Offering comprehensive technical coverage and insider information on best practices derived from lessons learned in the engineering, operation and maintenance of a wide array of rotating equipment, this new title presents: A unique "Best Practice" and "Lessons Learned" chapter framework, providing bite-sized, troubleshooting instruction on complex operation and maintenance issues across a wide array of industrial rotating machinery. Five chapters of completely new material combined with updated material from earlier volumes, making this the most comprehensive and up-to-date handbook for rotary equipment currently available. Intended for maintenance, engineering, operation and management, Forsthoffer's Best Practice Handbook for Rotating Machinery is a one-stop resource, packed with a lifetime's rotating machinery experience, to help you improve efficiency, safety, reliability and cost. A unique "Lessons Learned/Best Practices" component opens and acts as a framework for each chapter. Readers not only become familiar with a wide array of industrial rotating machinery; they learn how to operate and maintain it by adopting the troubleshooting perspective that the book provides Five chapters of completely new material combined with totally updated material from earlier volumes of Forsthoffer's Handbook make this the most comprehensive and up-to-date handbook for rotary equipment currently

Users of Forsthofer's multi-volume Rotating Equipment Handbooks now have an updated set, with expanded coverage, all in one convenient, reasonably-priced volume. The most complete guide of its kind, this is the standard handbook for chemical and process engineers. All new material on fluid flow, long pipe, fractionators, separators and accumulators, cooling towers, gas treating, blending, troubleshooting field cases, gas solubility, and density of irregular solids. This substantial addition of material will also include conversion tables and a new appendix, "Shortcut Equipment Design Methods." This convenient volume helps solve field engineering problems with its hundreds of common sense techniques, shortcuts, and calculations. Here, in a compact, easy-to-use format, are practical tips, handy formulas, correlations, curves, charts, tables, and shortcut methods that will save engineers valuable time and effort. Hundreds of common sense techniques and calculations help users quickly and accurately solve day-to-day design, operations, and equipment problems.

This practical reference provides in-depth information required to understand and properly estimate compressor capabilities and to select the proper designs. The many examples clearly illustrate key aspects to help readers understand the "real world" of compressor technology. Compressors: Selection and Sizing, Third Edition is completely updated with new API standards. The latest technology is presented in the areas of efficiency, 3-D geometry, electronics, and CAD. The critical chapter on negotiating the purchase of a compressor now reflects current industry practices for preparing detailed specifications, bid evaluations, engineering reviews, and installation. Book jacket.

Turboexpanders and Process Applications offers readers complete application criteria, functional parameters, and selection guidelines. This book is intended for the widest possible spectrum of engineering functions, including technical support, maintenance, operating, and managerial personnel in process plants, refineries, air liquefaction, natural gas separation, geothermal mining, and design contracting. The text distinguishes between cryogenic turboexpanders that are used to recover power from extremely cold gases, and hot gas expanders that accomplish the same objective with gases reaching temperatures in excess of 1000 degrees Fahrenheit. The authors have assembled in this book an optimum combination of process and mechanical technologies as they apply to turboexpanders. A highly practical, well-illustrated, and up-to-date overview of turboexpander construction features Appeals to a wide range of engineers. Drawing on his passion, training, and experience, Lieberman presents problems and troubleshooting techniques that are associated with specific processes, systems, and equipment, leading novice and practiced troubleshooters alike to the crux of malfunctions and failures. The fourth edition updates troubleshooting and design techniques, and adds seven new chapters with information on turbines, motors, heat exchangers, and environmentally friendly operations. Norm Lieberman sprinkles his troubleshooting guide with insightful and humorous anecdotes from 45 years in the petrochemical and refining industry. Features: * Nitty-gritty descriptions of common refinery and chemical plant problems and the diagnostic field observations, experiments, and calculations that reveal their origin * Troubleshooting checklists and references following each chapter * Practical advice for optimizing interactions with key plant operations personnel Exergy, Energy System Analysis, and Optimization theme is a component of the Encyclopedia of Energy Sciences, Engineering and Technology Resources which is part of the global Encyclopedia of Life Support Systems (EOLSS), an integrated compendium of twenty one Encyclopedias. These three volumes are organized into five different topics which represent the main scientific areas of the theme: 1. Exergy and Thermodynamic Analysis; 2. Thermoeconomic Analysis; 3. Modeling, Simulation and Optimization in Energy Systems; 4. Artificial Intelligence and Expert Systems in Energy Systems Analysis; 5. Sustainability Considerations in the Modeling of Energy Systems. Fundamentals and applications of characteristic methods are presented in these volumes. These three volumes are aimed at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs.

Effective methods for recovering gas energy using expanders Expanders for Oil and Gas Operations offers in-depth details on different types of expanders, addressing the background, mechanical design features, design and operating requirements, operational processes, and potential problems for each class of expander. The book also discusses rotor dynamics, vibration theory, material strength, life estimation, and probabilistic analysis. The information in this practical, illustrated resource will help you to maintain and improve existing expanders and implement design enhancements for increased expander capacity as well as lifespan and maximum energy reuse. Comprehensive coverage includes: CCU hot gas expanders Nitric acid expanders for chemical applications Turboexpanders/cryogenic turboexpanders Rotor dynamics Bladed disk vibration and reliability Damage in material and life analysis Probabilistic concept and risk assessment

The second edition of a comprehensive textbook that introduces turbomachinery and gas turbines through design methods and examples. This comprehensive textbook is unique in its design-focused approach to turbomachinery and gas turbines. It offers students and practicing engineers methods for configuring these machines to perform with the highest possible efficiency. Examples and problems are based on the actual design of turbomachinery and turbines. After an introductory chapter that outlines the goals of the book and provides definitions of terms and parts, the book offers a brief review of the basic principles of thermodynamics and efficiency definitions. The rest of the book is devoted to the analysis and design of real turbomachinery configurations and gas turbines, based on a consistent application of thermodynamic theory and a more empirical treatment of fluid dynamics that relies on the extensive use of design charts. Topics include turbine power cycles, diffusion and diffusers, the analysis and design of three-dimensional free-stream flow, and combustion systems and combustion calculations. The second edition updates every chapter, adding material on subjects that include flow correlations, energy transfer in turbomachines, and three-dimensional design. A solutions manual is available for instructors. This new MIT Press edition makes a popular text available again, with corrections and some updates, to a wide audience of students, professors, and professionals.

This illustrative reference presents a systematic approach to solving design problems by listing the needed equations, calculating degrees-of-freedom, developing calculation procedures to generate process specifications, and sizing equipment. Containing over thirty detailed examples of calculation procedures, the book tabulates numerous easy-to-follow calculation procedures as well as the relationships needed for sizing commonly used equipment. "Chemical Process Engineering" emphasizes the evaluation and selection of equipment by considering its mechanical design and encouraging the selection of standard-size equipment offered by manufacturers to lower costs.

Special edition of the Federal Register, containing a codification of documents of general applicability and future effect as of July 1, ... with ancillaries.

2011 Updated Reprint. Updated Annually. Global Mining and Mineral Industry Government Agencies Directory

[Copyright: e8841e6160b766622ce0a04a81629759](https://www.eolss.net/ViewFullText.aspx?doi=10.4018/978-1-4020-9816-2)