

Piping Design Guide

The Planning Guide to Piping Design

Provides background information, historical perspective, and expert commentary on the ASME B31.3 Code requirements for process piping design and construction. It provides the most complete coverage of the Code that is available today and is packed with additional information useful to those responsible for the design and mechanical integrity of process piping.

Whether it's called "fixed equipment (at ExxonMobil), "stationary equipment (at Shell), or "static equipment (in Europe), this type of equipment is the bread and butter of any process plant. Used in the petrochemical industry, pharmaceutical industry, food processing industry, paper industry, and the manufacturing process industries, stationary equipment must be kept operational and reliable for companies to maintain production and for employees to be safe from accidents. This series, the most comprehensive of its kind, uses real-life examples and time-tested rules of thumb to guide the mechanical engineer through issues of reliability and fitness-for-service. This volume on piping and pipeline assessment is the only handbook that the mechanical or pipeline engineer needs to assess pipes and pipelines for reliability and fitness-for-service. * Provides essential insight to make informed decisions on when to run, alter, repair, monitor, or replace equipment * How to perform these type of assessments and

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calculations on pipelines is a 'hot' issue in the petrochemical industry at this time *
There is very little information on the market right now for pipers and pipeliners with regard to pipe and pipeline fitness-for-service

An Applied Guide to Process and Plant Design, 2nd edition, is a guide to process plant design for both students and professional engineers. The book covers plant layout and the use of spreadsheet programs and key drawings produced by professional engineers as aids to design; subjects that are usually learned on the job rather than in education. You will learn how to produce smarter plant design through the use of computer tools, including Excel and AutoCAD, "What If Analysis, statistical tools, and Visual Basic for more complex problems. The book also includes a wealth of selection tables, covering the key aspects of professional plant design which engineering students and early-career engineers tend to find most challenging. Professor Moran draws on over 20 years' experience in process design to create an essential foundational book ideal for those who are new to process design, compliant with both professional practice and the IChemE degree accreditation guidelines. Includes new and expanded content, including illustrative case studies and practical examples
Explains how to deliver a process design that meets both business and safety criteria
Covers plant layout and the use of spreadsheet programs and key drawings as aids to design
Includes a comprehensive set of selection tables, covering aspects of professional plant design which early-career designers find most challenging

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Offers coverage of design, engineering, chemical resistance, costs, standards, codes and specifications. The text provides a resistance guide that lists over 800 chemicals and nearly 400 trade names cross-referenced to formal chemical names, covering all known chemical resistance data for the most popular thermoplastic piping systems. The book covers applications, selection, installation and maintenance.

Everything you need to design...install... replace and rehabilitate buried pipe systems Put a single-volume treasury of underground piping solutions at your command! A one-of-a kind resource, Buried Pipe Design, Second Edition, identifies and explains every factor you must know to work competently and confidently with the subsurface infrastructure of distribution systems, including sewer lines, drain lines, water mains, gas lines, telephone and electrical conduits, culverts, oil lines, coal slurry lines, subway tunnels and heat distribution lines. Within the pages of this acclaimed professional tool you'll find space-age remedies for the aging, deteriorating piping beneath America's cities -- and learn how to design long-lived systems capable of delivering vital services and meeting new demands. This comprehensive, state-of-the-art resource shows you how to:

- * Determine loads on buried pipes
- * Understand pipe hydraulics
- * Choose an installation design for buried gravity flow pipes
- * Design for both rigid pipe and flexible pipe
- * Select appropriate pipe for your application based on material properties
- * Work within safety guidelines
- * Handle soil issues, including pipe embedment and backfill
- * Employ the powerful tool of finite element analysis (FEA)
- * Adhere to current standards of the AWWA, ASTM, and other relevant standards organization
- * Save time with actual design examples
- * More!

This thorough update of A. P. Moser's classic guide is now

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twice the size of the previous edition -- reflecting the vast progress and changes in the field in mere decade! You'll find enormous amounts of all-new material, including:

- *External Loads chapter: minimum soil cover, with a discussion of similitude; soil subsidence; load due to temperature rise; seismic loads; and flotation
- *Design of Gravity Flow Pipes chapter: compaction techniques; E' analysis; parallel pipes and trenches; and analytical methods for predicting performance of buried flexible pipes
- Design of Pressure Pipes chapter: corrected theory for cyclic life of PVC pipe...strains induced by combined loading in buried pressurized flexible pipe
- Rigid Pipe Products chapter: the direct method...design strengths for concrete pipe...and SPIDA (Soil-Pipe Interaction Design and Analysis)
- *Steel and Ductile Iron Flexible Pipe Products chapter: three-dimensional FEA modeling of a corrugated steel pipe arch...tests on spiral ribbed steel pipe, low-stiffness ribbed steel pipe, and ductile iron pipe
- *Plastic Flexible Pipe Products chapter: long-term stress relaxation and strain testing of PVC pipes...frozen-in stresses...cyclic pressures and elevated temperatures...the AWWA study on the use of PVC...long-term ductility of PE...the ESCR and NCTL tests for PE...and full-scale testing of HDPE profile-wall pipes

*Entirely new chapter! You get new information on pipe handling and trenching as well as safety issues. Here are valuable directions for working with fast-growing trenchless methods for installing and rehabilitating pipelines PLUS: * MORE design examples * THE LATEST ASTM, AWWA, ASHTTO, and TRB standards * NEW DATA ON CUTTING-EDGE PIPE MATERIALS, including profile-wall polyethylene

For the design & drafting of industrial piping systems-This compact on-desk reference is used worldwide everywhere piping is designed & studied-on the job-in training programs & courses. 525 figures, tables, charts & photographs; 121 full-page presentations; 930 index/glossary

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entries. Describes pipe, piping components, valves & equipment. Presents charts, tables & examples for daily use. Provides a design reference for companies & consultants.

Supplements existing company standards & data. Serves as an instructional aid. Part I - Text: explains...Techniques of piping design. Assembling of piping from components, & methods of joining pipe & connecting to equipment. Design, organization, dimensioning, types of drawings, supporting, flexibility, & methods to translate concepts into finished designs. Part II - Tables: provide...Frequently needed data & information arranged for quick reference. Factors for establishing widths of pipeways. Spacing between pipes, with/without flanges. Dimensions & weights for pipe fittings, flanges, valves, etc. Conversion for customary & metric units. A metric supplement with dimensional data in millimeters. To order contact: Syentek Inc. P.O. Box 26588, San Francisco, CA 94126. Phone (415) 928-0471.

Maintaining and enhancing the high standards and excellent features that made the previous editions so popular, this book presents engineering and application information to incorporate, control, predict, and measure the performance of all fluid power components in hydraulic or pneumatic systems. Detailing developments in the ongoing "electronic revolution" of fluid power control, the third edition offers new and enlarged coverage of microprocessor control, "smart" actuators, virtual displays, position sensors, computer-aided design, performance testing, noise reduction, on-screen simulation of complex branch-flow networks, important engineering terms and conversion units, and more.

The Engineer's Guide to Plant Layout and Piping Design for the Oil and Gas Industries gives pipeline engineers and plant managers a critical real-world reference to design, manage, and implement safe and effective plants and piping systems for today's operations. This book fills

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a training void with complete and practical understanding of the requirements and procedures for producing a safe, economical, operable and maintainable process facility. Easy to understand for the novice, this guide includes critical standards, newer designs, practical checklists and rules of thumb. Due to a lack of structured training in academic and technical institutions, engineers and pipe designers today may understand various computer software programs but lack the fundamental understanding and implementation of how to lay out process plants and run piping correctly in the oil and gas industry. Starting with basic terms, codes and basis for selection, the book focuses on each piece of equipment, such as pumps, towers, underground piping, pipe sizes and supports, then goes on to cover piping stress analysis and the daily needed calculations to use on the job. Delivers a practical guide to pipe supports, structures and hangers available in one go-to source Includes information on stress analysis basics, quick checks, pipe sizing and pressure drop Ensures compliance with the latest piping and plant layout codes and complies with worldwide risk management legislation and HSE Focuses on each piece of equipment, such as pumps, towers, underground piping, pipe sizes and supports Covers piping stress analysis and the daily needed calculations to use on the job

Instant answers to your toughest questions on piping components and systems! It's impossible to know all the answers when piping questions are on the table - the field is just too broad. That's why even the most experienced engineers turn to Piping Handbook, edited by Mohinder L. Nayyar, with contribution from top experts in the field. The Handbook's 43 chapters - 14 of them new to this edition - and 9 new appendices provide, in one place, everything you need to work with any type of piping, in any type of piping system: *design* layout *selection of

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materials*fabrication and components*operation*installation*maintenanceThis world-class reference is packed with a comprehensive array of analytical tools, and illustrated with fully-worked-out examples and case histories. Thoroughly updated, this seventh edition features revised and new information on design practices, materials, practical applicationsand industry codes and standards ù plus every calculation you need to do the job.

1. Methodology -- pt. 2. Loss coefficients -- pt. 3. Flow phenomena.

This encyclopedic volume covers almost every phase of piping design - presenting procedures in a straightforward way.;Written by 82 world experts in the field, the Piping Design Handbook: details the basic principles of piping design; explores pipeline shortcut methods in an in-depth manner; and presents expanded rules of thumb for the piping desig

Pipeline Planning and Construction Field Manual aims to guide engineers and technicians in the processes of planning, designing, and construction of a pipeline system, as well as to provide the necessary tools for cost estimations, specifications, and field maintenance. The text includes understandable pipeline schematics, tables, and DIY checklists. This source is a collaborative work of a team of experts with over 180 years of combined experience throughout the United States and other countries in pipeline planning and construction. Comprised of 21 chapters, the book walks readers through the steps of pipeline construction and management. The comprehensive guide that this source provides enables engineers and technicians to manage routine auditing

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of technical work output relative to technical input and established expectations and standards, and to assess and estimate the work, including design integrity and product requirements, from its research to completion. Design, piping, civil, mechanical, petroleum, chemical, project production and project reservoir engineers, including novices and students, will find this book invaluable for their engineering practices. Back-of-the-envelope calculations Checklists for maintenance operations Checklists for environmental compliance Simulations, modeling tools and equipment design Guide for pump and pumping station placement

This essential new volume provides background information, historical perspective, and expert commentary on the ASME B31.1 Code requirements for power piping design and construction. It provides the most complete coverage of the Code that is available today and is packed with additional information useful to those responsible for the design and mechanical integrity of power piping. The author, Dr. Becht, is a long-serving member of ASME piping code committees and is the author of the highly successful book, *Process Piping: The Complete Guide to ASME B31.3*, also published by ASME Press and now in its third edition. Dr. Becht explains the principal intentions of the Code, covering the content of each of the Code's chapters. Book inserts cover special topics such as spring design, design for vibration, welding processes and bonding processes. Appendices in the book include useful information for pressure design and flexibility analysis as well as guidelines for computer flexibility analysis and

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design of piping systems with expansion joints. From the new designer wanting to know how to size a pipe wall thickness or design a spring to the expert piping engineer wanting to understand some nuance or intent of the Code, everyone whose career involves process piping will find this to be a valuable reference.

In-depth Details on Piping Systems Filled with examples drawn from years of design and field experience, this practical guide offers comprehensive information on piping installation, repair, and rehabilitation. All of the latest codes, standards, and specifications are included. Piping Systems Manual is a hands-on design and engineering resource that explains the reasons behind the designs. You will get full coverage of materials, components, calculations, specifications, safety, and much more. Hundreds of detailed illustrations make it easy to understand the best practices presented in the book. Piping Systems Manual covers: ASME B31 piping codes Specifications and standards Materials of construction Fittings Valves and appurtenances Pipe supports Drafting practice Pressure drop calculations Piping project anatomy Field work and start-up What goes wrong Special services Infrastructure Strategies for remote locations

Peter Smith has joined forces with skilled consultants to take his piping series to the next level. The Planning Guide to Piping Design covers the entire process of planning a plant model project from conceptual to mechanical completion, and explains where the piping lead falls in the process along with his roles and responsibilities. Piping

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Engineering Leads (or PEL's) used to only receive on-the-job training to learn the operation of producing a process plant. Over time, more schools and programs have developed a more advanced curriculum for piping engineers and designers. However, younger generations of engineers and designers are growing up with a much more technological view of piping design and are in need of a handbook that will explain the proven methods of planning and monitoring the piping design in step-by-step processes. This handbook will provide mentors in the process piping industries the bridge needed for the upcoming engineer and designer to grasp the requirements of piping supervision in the modern age.

One of the most important components of the infrastructure is the vast network of pipelines and process piping-literally millions and millions of miles. The term "pipelines" generally refers to the network of pipelines that transport water, sewage, steam, and gaseous and liquid hydrocarbons from sources (e.g., reservoirs, steam plants, oil and gas wells, refineries) to local distribution centers ("transmission pipelines"), and to the network of pipelines that distribute such products to local markets and end users ("distribution" pipelines). The term "process piping" generally refers to the system of pipes that transport process fluids (e.g. industrial gases, fuels, chemicals etc.) around an industrial facility involved in the manufacture of products or in the generation of power. It also is used to describe utility piping systems (e.g., air, steam, water, compressed air, fuels etc.) that are used in, or in support of the industrial process. Also,

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certain drainage piping--where corrosive or toxic fluids are being transported and severe conditions may be present, or where it is simply outside the scope of plumbing codes--is also sometimes classified as process piping. Some places where process piping is used are obvious, such as chemical and petrochemical plants, petroleum refineries, pharmaceutical manufacturing facilities and pulp & paper plants. However, there are many other not so obvious places where process piping is commonplace, such as semiconductor facilities, automotive and aircraft plants, water treatment operations, waste treatment facilities and many others. This book comprises of 9 course modules, which cover all aspects of piping design in easy to learn format. All topics are introduced to readers with no or limited background on the subject. A multiple choice quiz (total 255 questions) is provided at the end of each module to test the readers' knowledge and enhance learning. The book is very comprehensive and refresher to engineers and designers working in the field of piping in Oil and Gas, Chemical and Industrial plants. It is also very useful to fresh engineers joining industries for improving their knowledge in the field of fluid transportation and pipework.

This book is a "no nonsense" guide to the principle intentions of the codes or standards and provides advice on compliance. After using this book the reader should come away with a clear understanding of how piping systems fail and what the code requires the designer, manufacturer, fabricator, supplier, erector, examiner, inspector, and owner to do to prevent such failures. The focus of the book is to enhance participants'

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understanding and application of the spirit of the code or standard and form a plan for compliance. The book is enhanced by a multitude of calculations to assist in problem solving, directly applying the rules and equations for specific design and operating conditions to illustrate correct applications. Each calculation is based on a specific code. Written by a professional/educator with over 35 years of experience Covers all major codes and standards Demonstrates how the code and standard has been correctly and incorrectly applied

The only comprehensive and authoritative reference guide to the ASME Bioprocessing Piping and Equipment (BPE) standard This is a companion guide to the ASME Bioprocessing Piping and Equipment (BPE) Standard and explains what lies behind many of the requirements and recommendations within that industry standard. Following an introductory narrative to the Standard's early history, industry related codes and standards are explained; the design and engineering aspects cover construction materials, both metallic and nonmetallic; then components, fabrication, assembly and installation of piping systems are explored. Examination, Inspection and Testing then precede the ASME BPE certification process, concluding with a discussion on system design. The author draws on many years' experience and insights from first-hand involvement in the field of industrial piping design, engineering, construction, and management, which includes the bioprocessing industry. The reader will learn why dimensions and tolerances, process instrumentation, and material selection play such

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an integral part in the manufacture of components and instrumentation. This easy to understand and navigate guide will assist engineers (design, piping, chemical, etc.) who need to understand the basis for much of the Standard's content, as do the contractors and inspectors who have to meet and validate compliance with the BPE Standard.

Heat Exchanger Design Guide: A Practical Guide for Planning, Selecting and Designing of Shell and Tube Exchangers takes users on a step-by-step guide to the design of heat exchangers in daily practice, showing how to determine the effective driving temperature difference for heat transfer. Users will learn how to calculate heat transfer coefficients for convective heat transfer, condensing, and evaporating using simple equations. Dew and bubble points and lines are covered, with all calculations supported with examples. This practical guide is designed to help engineers solve typical problems they might encounter in their day-to-day work, and will also serve as a useful reference for students learning about the field. The book is extensively illustrated with figures in support of the text and includes calculation examples to ensure users are fully equipped to select, design, and operate heat exchangers. Covers design method and practical correlations needed to design practical heat exchangers for process application Includes geometrical calculations for the tube and shell side, also covering boiling and condensation heat transfer Explores heat transfer coefficients and temperature differences Designed to help engineers solve typical problems they might encounter in their day-to-day work, but also ideal as a useful reference for students

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learning about the field

From development of the initial requirements to final drawings used in construction, this authoritative reference for the design and drafting of industrial piping systems provides a step-by-step guide to piping design. Created as an in-depth resource for professionals, this piping bible is as valuable in the field as it is in the office or the classroom. Among the topics covered in this encyclopedic survey are techniques of piping design, the assembly of piping from components, processes for connecting piping to equipment, office organization, methods to translate concepts into finished designs, and terms and abbreviations concerned. An expansive selection of charts and tables presents a wide array of information--frequently used data; factors for establishing pipeways width; spacing between pipes with and without flanges and for "jumpovers" and "runarounds;" principal dimensions and weights for key components; conversion for customary and metric units; direct-reading metric conversion tables for dimensions and data; and a metric supplement with principal dimensional data in millimeters--handily organized for quick reference.

The Planning Guide to Piping Design, Second Edition, covers the entire process of managing and executing project piping designs, from conceptual to mechanical completion, also explaining what roles and responsibilities are

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required of the piping lead during the process. The book explains proven piping design methods in step-by-step processes that cover the increasing use of new technologies and software. Extended coverage is provided for the piping lead to manage piping design activities, which include supervising, planning, scheduling, evaluating manpower, monitoring progress and communicating the piping design. With newly revised chapters and the addition of a chapter on CAD software, the book provides the mentorship for piping leads, engineers and designers to grasp the requirements of piping supervision in the modern age. Provides essential standards, specifications and checklists and their importance in the initial set-up phase of piping project's execution Explains and provides real-world examples of key procedures that the piping lead can use to monitor progress Describes project deliverables for both small and complex size projects Offers newly revised chapters including a new chapter on CAD software

Annotation Written for the piper and engineer in the field, this volume fills a huge void in piping literature since the Rip Weaver books of the 90s were taken out of print. Focussing not only on Auto CAD, but also on other computer-aided design programmes as well and manual techniques not found anywhere else, the book covers the entire spectrum of needs for the piping engineer. Covering general piping systems, this basic guide for the piping engineer offers standards in

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practices for covered in the original Rip Weaver series. It is the perfect introduction to the design of piping systems, various processes and the layout of pipe work connecting the major items of equipment for the new hire, the engineering student and the veteran engineer needing a reference.

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