

William S Janna Design Of Fluid Thermal Systems

a fully comprehensive guide to thermal systems design covering fluid dynamics thermodynamics heat transfer and thermodynamic power cycles bridging the gap between the fundamental concepts of fluid mechanics heat transfer and thermodynamics and the practical design of thermo fluids components and systems this textbook focuses on the design of internal fluid flow systems coiled heat exchangers and performance analysis of power plant systems the topics are arranged so that each builds upon the previous chapter to convey to the reader that topics are not stand alone items during the design process and that they all must come together to produce a successful design because the complete design or modification of modern equipment and systems requires knowledge of current industry practices the authors highlight the use of manufacturer s catalogs to select equipment and practical examples are included throughout to give readers an exhaustive illustration of the fundamental aspects of the design process key features demonstrates how industrial equipment and systems are designed covering the underlying theory and practical application of thermo fluid system design practical rules of thumb are included in the text as practical notes to underline their importance in current practice and provide additional information includes an instructor s manual hosted on the book s companion website

numerous design oriented end of chapter problems also provide realistic settings for application of the material discussed

design theory of fluidic components is an 11 chapter text that discusses the most pertinent results of fluidics research and in closely related fields after providing an overview of the basic components and design theory of fluidics this book goes on exploring the passive fluid components and the theory of jets the following chapters specifically deal with the factors that give rise to lumped resistance capacitance and inductance as well as the fluid transients in lines these topics are followed by discussions on various jet velocity distributions and a simplified theory of motion of jets in a pressure gradient the remaining six chapters are devoted to the active fluidic components and begin with an examination of the characteristic curves that are necessary to describe the performance of the active components these chapters also cover the extent to which the performance of specific fluidic components can be predicted analytically this book is of great value to fluidic research engineers and graduate mechanical engineering students

this book is designed to serve senior level engineering students taking a capstone design course in fluid and thermal systems design it is built from the ground up with the needs and interests of practicing engineers in mind the emphasis is on

practical applications the book begins with a discussion of design methodology including the process of bidding to obtain a project and project management techniques the text continues with an introductory overview of fluid thermal systems a pump and pumping system a household air conditioner a baseboard heater a water slide and a vacuum cleaner are among the examples given and a review of the properties of fluids and the equations of fluid mechanics the text then offers an in depth discussion of piping systems including the economics of pipe size selection janna examines pumps including net positive suction head considerations and piping systems he provides the reader with the ability to design an entire system for moving fluids that is efficient and cost effective next the book provides a review of basic heat transfer principles and the analysis of heat exchangers including double pipe shell and tube plate and frame cross flow heat exchangers design considerations for these exchangers are also discussed the text concludes with a chapter of term projects that may be undertaken by teams of students important notice media content referenced within the product description or the product text may not be available in the ebook version

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a sourcebook offering an up to date perspective on a variety of topics and using practical applications oriented data

necessary for the design and evaluation of internal fluid system pressure losses it has been prepared for the practicing engineer who understands fluid flow fundamentals

dieses aktuelle referenzwerk behandelt numerische optimierungsmethoden für strömungsmaschinen und die wichtigsten industriellen anwendungen grundlagen sind umfangreiche forschung und erfahrung der autoren die logischen zusammenhänge um den bereich der numerischen strömungssimulation cfd zu verstehen werden anhand der grundlagen der strömungsmechanik von strömungsmaschinen und ihrer komponenten erläutert im an schluss folgt eine einföhrung in methoden der ein und mehrzieloptimierung die automatische optimierung in ersatzmodelle und entwicklungsalgorithmen das fachbuch schließt mit der ausführlichen erklärung von designansätzen und anwendungen für pumpen turbinen kompressoren und weiteren systemen von strömungsmaschinen der nachdruck liegt hier bei systemen für erneuerbare energien die autoren sind führende experten des fachgebiets ein handliches fachbuch zu optimierungsmethoden mittels numerischer strömungssimulation bei strömungsmaschinen beschreibt wichtige anwendungsbereiche in der industrie und enthält kapitel zu systemen für erneuerbaren energien design optimization of fluid machinery ist ein wichtiger leitfaden für graduierte forschter und ingenieure aus den bereichen strömungsmaschinen und zugehörige optimierungsmethoden als fachbuch mit allem wissenswerten zu dem thema richtet es sich an studenten höherer semester der fachrichtungen maschinenbau und verwandter bereiche der strömungssimulation und luft raumfahrttechnik

describes such problems as liquid gas flows transverse to flow direction hydraulic and hydrodynamic methods of calculating the equalizing effects of drag and velocity profiles it presents theoretical and applied discussions and calculation procedures for aerodynamics in the design and operation of industrial equipment the text uniquely assembles both theoretical and applied discussions of physical processes necessary for design efficiency

a practical and accessible introductory textbook that enables engineering students to design and optimize typical thermofluid systems engineering design and optimization of thermofluid systems is designed to help students and professionals alike understand the design and optimization techniques used to create complex engineering systems that incorporate heat transfer thermodynamics fluid dynamics and mass transfer designed for thermal systems design courses this comprehensive textbook covers thermofluid theory practical applications and established techniques for improved

performance efficiency and economy of thermofluid systems students gain a solid understanding of best practices for the design of pumps compressors heat exchangers hvac systems power generation systems and more covering the material using a pragmatic student friendly approach the text begins by introducing design optimization and engineering economics with emphasis on the importance of engineering optimization in maximizing efficiency and minimizing cost subsequent chapters review representative thermofluid systems and devices and discuss basic mathematical models for describing thermofluid systems moving on to system simulation students work with the classical calculus method the lagrange multiplier canonical search methods and geometric programming throughout the text examples and practice problems integrate emerging industry technologies to show students how key concepts are applied in the real world this well balanced textbook integrates underlying thermofluid principles the fundamentals of engineering design and a variety of optimization methods covers optimization techniques alongside thermofluid system theory provides readers best practices to follow on the job when designing thermofluid systems contains numerous tables figures examples and problem sets emphasizing optimization techniques more than any other thermofluid system textbook available engineering design and optimization of thermofluid systems is the ideal textbook for upper level undergraduate and graduate students and instructors in thermal systems design courses and a valuable reference for professional mechanical engineers and researchers in the field

disk contains failure scenario tables

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