## SI EDITION



# Design of Fluid Thermal Systems 4e



# **Design Of Fluid Thermal Systems Si Version**

American Society of Mechanical Engineers. Winter Annual Meeting

#### **Design Of Fluid Thermal Systems Si Version:**

Design of Fluid Thermal Systems, SI Edition William S. Janna,2014-04-28 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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undergraduate and graduate students an insightful exposure to real world design projects. The author delivers a brief review of the laws of thermodynamics fluid mechanics heat transfer and combustion before moving on to a more expansive discussion of how to apply these fundamentals to design common thermal systems like boilers combustion turbines heat pumps and refrigeration systems. The book includes design prompts for 14 real world projects teaching students and readers how to approach tasks like preparing Process Flow Diagrams and computing the thermodynamic details necessary to describe the states designated therein Readers will learn to size pipes ducts and major equipment and to prepare Piping and Instrumentation Diagrams that contain the instruments valves and control loops needed for automatic functioning of the system The Second Edition offers an updated look at the pedagogy of conservation equations new examples of fuel rich combustion and a new summary of techniques to mitigate against thermal expansion and shock Readers will also enjoy Thorough introductions to thermodynamics fluid mechanics and heat transfer including topics like the thermodynamics of state flow in porous media and radiant exchange A broad exploration of combustion fundamentals including pollutant formation and control combustion safety and simple tools for computing thermochemical equilibrium when product gases contain carbon monoxide and hydrogen Practical discussions of process flow diagrams including intelligent CAD equipment process lines valves and instruments and non engineering items In depth examinations of advanced thermodynamics including customized functions to compute thermodynamic properties of air combustion products water steam and ammonia right in the user's Excel workbook Perfect for students and instructors in capstone design courses Thermal Systems Design Fundamentals and Projects is also a must read resource for mechanical and chemical engineering practitioners who are seeking to extend their engineering know how to a wide range of unfamiliar thermal systems **Fundamentals of** Engineering Thermodynamics, SI Version Michael J. Moran, Howard N. Shapiro, 1998-07-07 Presents a comprehensive and rigorous treatment of the subject from the classical perspective to offer a problem solving methodology that encourages systematic thinking Noted for its treatment of the second law this text clearly presents both theory and application The presentation of chemical availability has been extended by a cutting edge discussion of standard chemical availability Design applications and problems have been updated to include economic considerations Environmental topics have also been expanded and updated The new version of Interactive Thermodynamics IT is a powerful windows based software program that now includes equation solver printing graphing data retrival and simulation capabilities **Advanced Analytic and** Control Techniques for Thermal Systems with Heat Exchangers Libor Pekar, 2020-07-10 Advanced Analytic Control Techniques for Thermal Systems with Heat Exchangers presents the latest research on sophisticated analytic and control techniques specific for Heat Exchangers HXs and heat Exchanger Networks HXNs such as Stability Analysis Efficiency of HXs Fouling Effect Delay Phenomenon Robust Control Algebraic Control Geometric Control Optimal Control Fuzzy Control and Artificial Intelligence techniques Editor Libor Pekar and his team of global expert contributors combine their knowledge

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