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Nota di contenuto	Introduction to Thermo-Fluids Systems Design; Contents; Preface; List of Figures; List of Tables; List of Practical Notes; List of Conversion Factors; 1 Design of Thermo-Fluids Systems; 1.1 Engineering Design-Definition; 1.2 Types of Design in Thermo-Fluid Science; 1.3 Difference between Design and Analysis; 1.4 Classification of Design; 1.5 General Steps in Design; 1.6 Abridged Steps in the Design Process; 2 Air Distribution Systems; 2.1 Fluid Mechanics-A Brief Review; 2.1.1 Internal Flow; 2.2 Air Duct Sizing-Special Design Considerations; 2.2.1 General Considerations 2.2.2 Sizing Straight Rectangular Air Ducts 2.2.3 Use of an Air Duct Calculator to Size Rectangular Air Ducts; 2.3 Minor Head Loss in a Run of Pipe or Duct; 2.4 Minor Losses in the Design of Air Duct Systems-Equal Friction Method; 2.5 Fans-Brief Overview and Selection Procedures; 2.5.1 Classification and Terminology; 2.5.2 Types of Fans;

2.5.3 Fan Performance; 2.5.4 Fan Selection from Manufacturer's Data or Performance Curves; 2.5.5 Fan Laws; 2.6 Design for Advanced Technology-Small Duct High-Velocity (SDHV) Air Distribution Systems; Problems; References and Further Reading
3 Liquid Piping Systems 3.1 Liquid Piping Systems; 3.2 Minor Losses: Fittings and Valves in Liquid Piping Systems; 3.2.1 Fittings; 3.2.2 Valves; 3.2.3 A Typical Piping System-A Closed-Loop Fuel Oil Piping System; 3.3 Sizing Liquid Piping Systems; 3.3.1 General Design Considerations; 3.3.2 Pipe Data for Building Water Systems; 3.4 Fluid Machines (Pumps) and Pump-Pipe Matching; 3.4.1 Classifications and Terminology; 3.4.2 Types of Pumps; 3.4.3 Pump Fundamentals; 3.4.4 Pump Performance and System Curves; 3.4.5 Pump Performance Curves for a Family of Pumps
3.4.6 A Manufacturer's Performance Plot for a Family of Centrifugal Pumps 3.4.7 Cavitation and Net Positive Suction Head; 3.4.8 Pump Scaling Laws: Nondimensional Pump Parameters; 3.4.9 Application of the Nondimensional Pump Parameters-Affinity Laws; 3.4.10 Nondimensional Form of the Pump Efficiency; 3.5 Design of Piping Systems Complete with In-Line or Base-Mounted Pumps; 3.5.1 Open-Loop Piping System; 3.5.2 Closed-Loop Piping System; Problems; References and Further Reading; 4 Fundamentals of Heat Exchanger Design; 4.1 Definition and Requirements; 4.2 Types of Heat Exchangers 4.2.1 Double-Pipe Heat Exchangers 4.2.2 Compact Heat Exchangers; 4.2.3 Shell-and-Tube Heat Exchangers; 4.3 The Overall Heat Transfer Coefficient; 4.3.1 The Thermal Resistance Network for Plane Walls-Brief Review; 4.3.2 Thermal Resistance from Fouling-The Fouling Factor; 4.4 The Convection Heat Transfer Coefficients-Forced Convection; 4.4.1 Nusselt Number-Fully Developed Internal Laminar Flows; 4.4.2 Nusselt Number-Developing Internal Laminar Flows-Correlation Equation; 4.4.3 Nusselt Number-Turbulent Flows in Smooth Tubes: Dittus-Boelter Equation
4.4.4 Nusselt Number-Turbulent Flows in Smooth Tubes: Gnielinski's Equation

Sommario/riassunto

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.
