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Nota di contenuto	Cover; Contents; Foreword; Preface; Acknowledgements; List of figures; List of tables; Chapter 1 Introduction; 1.1 What is a furnace?; 1.1.1 Furnace outline; 1.1.2 Furnace classification; 1.1.3 Principle objectives of furnace designers and operators; 1.2 Where are furnaces used? Brief review of current furnace applications and technology; 1.2.1 Ceramics, brick making and pottery; 1.2.2 Cement and lime; 1.2.3 Glass making; 1.2.4 Metal ore smelting; 1.2.5 Metal refining; 1.2.6 Flash and fluid bed furnaces; 1.2.7 Metal physical processing; 1.2.8 Incinerators and resource recovery furnaces 1.2.9 Furnaces with reducing atmospheres 1.2.10 Oil refining and petrochemical furnaces; 1.3 Drivers for improved efficiency; 1.4 Concluding remarks; References; Chapter 2 The combustion process; 2.1 Simple combustion chemistry; 2.1.1 The complete oxidation of carbon; 2.1.2 The complete oxidation of hydrogen; 2.1.3 The incomplete oxidation of carbon; 2.1.4 The oxidation of carbon monoxide; 2.2 Combustion calculations; 2.3 Chemical reaction kinetics; 2.3.1 Types of reactions; 2.3.2 Reaction rate theory; 2.3.3 Reaction rate behaviour; 2.3.4 Burning droplets and particles 2.4 The physics of combustion 2.4.1 The role of primary air; 2.4.2 The role of swirl flows; 2.4.3 Turbulence in jets; 2.4.4 Secondary flow aerodynamics; 2.4.5 Effect of excess air on fuel consumption; 2.4.6

Multiple burner installations; Nomenclature; References; Chapter 3 Fuels for furnaces; 3.1 Gaseous fuels; 3.1.1 Properties of natural gas; 3.1.2 Manufactured gas; 3.1.3 Wobbe number or index; 3.1.4 Flammability limits; 3.1.5 Flame radiation from gaseous fuels; 3.2 Liquid fuels; 3.3 Solid fuels; 3.3.1 Ash; 3.4 Waste fuels; 3.5 Choice of fuel; 3.5.1 Furnace performance; 3.6 Safety  
3.7 Emissions Nomenclature; References; Solid fuel bibliography; Chapter 4 An introduction to heat transfer in furnaces; 4.1 Conduction; 4.1.1 Steady state conduction; 4.1.2 Transient conduction; 4.2 Convection; 4.2.1 Dimensional analysis; 4.2.2 Application to convective heat transfer; 4.2.3 Evaluating convective heat transfer coefficients; 4.2.4 High temperature convective heat transfer; 4.3 Radiation; 4.3.1 Physical basics of radiative exchange; 4.3.2 Emissivity and absorptivity; 4.3.3 View factors; 4.3.4 Mean beam length; 4.4 Electrical heating; 4.4.1 Resistance heating; 4.4.2 Arc heating  
4.4.3 Induction heating 4.4.4 Dielectric heating; 4.4.5 Infrared heating; Nomenclature; References; Appendix 4A: Tables of emissivity data; Chapter 5 Flames and burners for furnaces; 5.1 Types of flame; 5.1.1 Premixed flames; 5.1.2 Turbulent jet diffusion flames; 5.1.3 Heterogeneous combustion; 5.2 Function of a burner and basics of burner design; 5.2.1 The essential importance of heat flux profiles; 5.2.2 Flame stabilisation; 5.3 Gas burners; 5.3.1 Premixed burners; 5.3.2 Turbulent jet diffusion burners; 5.3.3 Precessing jet diffusion burners; 5.4 Oil burners; 5.4.1 Turndown; 5.4.2 Atomisers  
5.5 Pulverised coal burners

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Sommario/riassunto

Industrial and Process Furnaces provides a comprehensive reference to all aspects of furnace operation and design, with coverage of key topics that plant and process engineers and operators need to understand, including the combustion process and its control, furnace fuels, efficiency, burner design and selection, aerodynamics, heat release profiles, furnace atmosphere, safety and emissions. \* Helps to understand complex heat and mass transfer and combustion problems\*  
Outlines the key elements of furnace theory for optimum design\*  
Shows how to achieve best possible furnace oper

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