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Nota di contenuto	Front Cover; Pinch Analysis and Process Integration; Copyright page; Contents; Foreword; Foreword to the first edition; Preface; Acknowledgements; Figure acknowledgements; Chapter 1: Introduction; 1.1 What is pinch analysis?; 1.2 History and industrial experience; 1.3 Why does pinch analysis work?; 1.4 The concept of process synthesis; 1.5 The role of thermodynamics in process design; 1.5.1 How can we apply thermodynamics practically?; 1.5.2 Capital and energy costs; 1.6 Learning and applying the techniques; Chapter 2: Key concepts of pinch analysis; 2.1 Heat recovery and heat exchange 2.1.1 Basic concepts of heat exchange 2.1.2 The temperature-enthalpy diagram; 2.1.3 Composite curves; 2.1.4 A targeting procedure: the ""Problem Table""; 2.1.5 The grand composite curve and shifted composite curves; 2.2 The pinch and its significance; 2.3 Heat exchanger network design; 2.3.1 Network grid representation; 2.3.2 A ""commonsense"" network design; 2.3.3 Design for maximum energy recovery; 2.3.4 A word about design strategy; 2.4 Choosing T[sub (min)]: supertargeting; 2.4.1 Further implications of the choice of T

[sub(min)]; 2.5 Methodology of pinch analysis

2.5.1 The range of pinch analysis techniques 2.5.2 How to do a pinch study; Exercise; Chapter 3: Data extraction and energy targeting; 3.1 Data extraction; 3.1.1 Heat and mass balance; 3.1.2 Stream data extraction; 3.1.3 Calculating heat loads and heat capacities; 3.1.4 Choosing streams; 3.1.5 Mixing; 3.1.6 Heat losses; 3.1.7 Summary guidelines; 3.2 Case study: organics distillation plant; 3.2.1 Process description; 3.2.2 Heat and mass balance; 3.2.3 Stream data extraction; 3.2.4 Cost data; 3.3 Energy targeting; 3.3.1 $T_{\text{sub(min)}}$ contributions for individual streams; 3.3.2 Threshold problems
3.4 Multiple utilities 3.4.1 Types of utility; 3.4.2 The Appropriate Placement principle; 3.4.3 Constant-temperature utilities; 3.4.4 Utility pinches; 3.4.5 Variable-temperature utilities; 3.4.6 Balanced composite and grand composite curves; 3.4.7 Choice of multiple utility levels; 3.5 More advanced energy targeting; 3.5.1 Zonal targeting; 3.5.2 Pressure drop targeting; 3.6 Targeting heat exchange units, area and shells; 3.6.1 Targeting for number of units; 3.6.2 Targeting for the minimum number of units; 3.6.3 Area targeting; 3.6.4 Deviations from pure countercurrent flow
3.6.5 Number of shells targeting 3.6.6 Performance of existing systems; 3.6.7 Topology traps; 3.7 Supertargeting: cost targeting for optimal $T_{\text{sub(min)}}$; 3.7.1 Trade-offs in choosing $T_{\text{sub(min)}}$; 3.7.2 Illustration for two-stream example; 3.7.3 Factors affecting the optimal $T_{\text{sub(min)}}$; 3.7.4 Approximate estimation of ideal $T_{\text{sub(min)}}$; 3.8 Targeting for organics distillation plant case study; 3.8.1 Energy targeting; 3.8.2 Area targeting; 3.8.3 Cost targeting; 3.8.4 Zonal targeting; 3.8.5 Targeting with utility streams included
3.9 Appendix: Algorithms for Problem Table and composite curves

Sommario/riassunto

Pinch analysis and related techniques are the key to design of inherently energy-efficient plants. This book shows engineers how to understand and optimize energy use in their processes, whether large or small. Energy savings go straight to the bottom line as increased profit, as well as reducing emissions. This is the key guide to process integration for both experienced and newly qualified engineers, as well as academics and students. It begins with an introduction to the main concepts of pinch analysis, the calculation of energy targets for a given process, the pinch temperature and
