

Correlation Guide

Felder & Rousseau Chapter.Section	Murphy Chapter.Section
2 Introduction to Engineering Calculations	Chapter 2
2.1 Units and Dimensions	2.2.1
2.2 Conversion of Units	2.2.1
2.3 Systems of Units	2.2.1
2.4 Force and Weight	6.1.4
2.5 Numerical Calculation and Estimation	2.6.2
2.6 Dimensional Homogeneity	2.2.1
2.7 Process Data Representation and Analysis	Appendix A.3
3 Processes and Process Variables	Chapter 2
3.1 Mass and Volume	2.2.1, 2.2.4
3.2 Flow Rate	2.2.5
3.3 Chemical Composition	2.2.2, 2.2.4
3.4 Pressure	2.2.3
3.5 Temperature	2.2.3
4 Fundamentals of Material Balances	
4.1 Process Classification	2.3.4
4.2 Balances	1.5, 2.4.2
4.3 Material Balance Calculations	2.4.3 – 2.4.5, 2.6.3, 3.2.1 – 3.2.2
4.3a Flowcharts	2.3.1 – 2.3.3
4.3b Flowchart scaling and basis of calculation	2.4.1
4.3c Balancing a process	2.4.2, 2.4.3
4.3d Degree-of-Freedom Analysis	2.5, 3.2.3
4.3e General Procedure for Single-Unit Process...	2.4.3
4.4 Balances on Multiple-Unit Processes	2.6.1 – 2.6.3
4.5 Recycle and Bypass	2.4.5, 3.4, 4.3, 5.3.1
4.6 Chemical Reaction Stoichiometry	1.3, 2.4.2, 3.3, 4.4
4.7 Balances on Reactive Processes	2.4, 3.2, 3.3, 4.2
4.8 Combustion Reactions	4.2, 4.3
5 Single-Phase Systems	
5.1 Liquid and Solid Densities	2.2.4
5.2 Ideal Gases	2.2.4
5.3 Equations of State for Nonideal Gases	Equations of state for nonideal behavior are not discussed.
5.4 The Compressibility Factor Equation of State	
6 Single-Phase Systems	
6.1 Single-Component Phase Equilibrium	5.5.2
6.2 The Gibbs Phase Rule	5.5.1
6.3 Gas-Liquid Systems: One Condensable Component	5.5.2

Felder & Rousseau Chapter.Section	Murphy Chapter.Section
6.4 Multicomponent Gas-Liquid Systems	5.5.3.2 – 5.5.3.4
6.5 Solutions of Solids in Liquids	5.5.3.1, 5.5.3.6
6.6 Equilibrium Between Two Liquid Phases	5.5.3.5
6.7 Adsorption on Solid Surfaces	5.6.4
7 Energy and Energy Balances	
7.1 Forms of Energy: The First Law of Thermodynamics	6.1, 6.2
7.2 Kinetic and Potential Energy	6.3.1
7.3 Energy Balances on Closed Systems	6.6.1
7.4 Energy Balances on Open Systems at Steady State	6.6.1
7.5 Tables of Thermodynamic Data	6.3.3
7.6 Energy Balance Procedures	6.6.2
7.7 Mechanical Energy Balance	6.7.1
8 Balances on Nonreactive Processes	
8.1 Elements of Energy Balance Calculations	6.2, 6.5
8.2 Changes in Pressure at Constant Temperature	6.6 (Example 6.10)
8.3 Changes in Temperature	6.6 (Examples 6.12, 6.13)
8.4 Phase Change Operations	6.6 (Example 6.14)
8.5 Mixing and Solution	6.6 (Example 6.12)
9 Balances on Reactive Processes	
9.1 Heats of Reaction	4.4.2, 6.3.4
9.2 Measurement and Calculation of Heats of Reaction	6.3.4
9.3 Formation Reaction and Heats of Formation	4.4.2, Appendix B.3
9.4 Heats of Combustion	
9.5 Energy Balances on Reactive Processes	6.6 (Examples 6.15, 6.16)
9.6 Fuels and Combustion	6.6 (Examples 6.20, 6.21, 6.22, 6.23)
10 Computer-Aided Balance Calculations	Concepts related to process flow sheeting (Ch 10 in Felder & Rousseau) are discussed throughout Murphy in Chapters 3-6.
10.1 Degree-of-Freedom Analysis Revisited	
10.2 Sequential Modular Simulation	
10.3 Equation-Based Simulation	
10.4 Commercial Process Simulation Packages	
10.5 Final Considerations	
11 Balances on Transient Processes	Transient mass and energy balances are not treated as a separate topic but rather included throughout the text. See for example Examples 3.10, 3.11, 4.3, 4.6, 4.20, 6.11, 6.17.
11.1 The General Balance Equation...Again	
11.2 Material Balances	
11.3 Energy Balances on Single-Phase Nonreactive Processes	
11.4 Simultaneous Transient Balances	

Topics in Murphy not covered in Felder & Rousseau:

- atom economy (1.5.2)
- process economy (1.5.3)
- linear equations and chemical reactions (3.3)
- heuristics for selecting and sequencing separation technologies (5.1.4)
- performance specifications for separators (5.3)