## Table of Contents

List of Figures  v
List of Tables  vii
About the Authors  ix
Foreword  xi
Acknowledgments  xiii

### Chapter 1. Chemical Feed Quality Control  1
  - Quality Control Leads to Quality Assurance  1
  - Chemical Selection and Dosage Determination  3
  - Chemical Purchasing Specifications  5
  - Storage Considerations Affecting Chemical Feed  9
  - Feed Equipment Calibration or Verification  9
  - Feed Rate Adjustment and Equipment Accuracy  10
  - Chemical Inventory Control  12
  - Chemical Addition and Mixing  12
  - Chemical Feed Locations and Timing  13
  - Quality Control at Each Step  13

### Chapter 2. Chemical Feed—Common System Components  15
  - Conveyance  15
  - Dispersion  18
  - Dosage Control  23

### Chapter 3. Chemical Feed of Gases—Equipment and Systems  27
  - Chemical Details  27
  - Delivery and Handling  31
  - Chemical Feeders  31
  - Gas Feed Systems  33
  - Feeding Gases in Water Treatment  38

### Chapter 4. Chemical Feed of Gases—Calculations and Examples  39
  - Gas Feed Directly into the Water Flow  39
  - Ozone Feed Calculations  42
  - Oxygen Feed System Calculation Examples  43
  - Air Feed System Calculation Examples  44
  - Chlorine Dioxide Feed Calculations  46
  - Chlorine and Sodium Chlorite Feed Calculators  48

### Chapter 5. Dry Chemical Feeders and Systems  55
  - Chemical Storage and Handling  59
  - Chemical Feeders  60

Copyright © 2009 American Water Works Association. All Rights Reserved.
Calibration Devices  62
Solution Systems  64

Chapter 6.  Dry Chemical Feed—Calculations and Examples  67
  Full-Strength Chemical Feed Calculations  67
  Percent Active Ingredient Chemical Feed Calculations  68
  Solution Preparation Using Dry Chemicals: Batch Preparation
  Calculations  70
  Chemical Usage and Inventory Control  72

Chapter 7.  Liquid Chemical Feed Equipment and Systems  75
  Chemical Receiving and Storage  76
  Liquid Chemical Feed Equipment  77
  Liquid Chemical Feed Systems  81
  On-Site Hypochlorite Generation and Feed Systems  84
  Polymer Feed Systems  85
  Metering Pump Calibration  89
  Feeding Liquid Chemicals in Water Treatment  93

Chapter 8.  Liquid Chemical Feed—Calculations and Examples  95
  Direct Feed Calculations  95
  Diluted Chemical Feed Calculations  97
  Relationship of Density to Specific Gravity  99
  Chemical Feed Rate Calculation Examples  102
  Calculation Starting with Different Units  103
  Inventory Management for Liquid Chemicals  104
  Chemical Feed in Dilution Tank Systems (Two-Tank Systems)  107

Appendix A: Chemical Specification Example Language  111

Appendix B: Conversion Factors  115
  Conversion of US Customary Units  115
  Metric Conversions  119

Appendix C: Density Tables For Common Liquid Chemicals  125

Appendix D: Calculator Derivations  135
  Gas Chemical Feed Calculators  135
  Dry Chemical Feed Calculators  141
  Liquid Chemical Feed Calculators  142

Appendix E: Atomic Weights of Elements  147

References  151