



Contents

Introduction vii

CHAPTER 1: *Properties of Water*1

CHAPTER 2: *Gravity Clarification*11

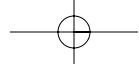
- The Purpose of Gravity Clarifiers 11
- How Clarifiers Work 11
- Clarifier Equipment Designs 20
- Maintaining System Reliability 35
- Monitoring Gravity Clarifier Performance 36
- Data Sheets 56

CHAPTER 3: *Filtration*61

- The Purpose of Media Filters 61
- Gravity Media Filters 62
- Pressure Media Filters 67
- Membrane Filtration 75
- Data Sheets 79

CHAPTER 4: *Ion Exchange*87

- Sodium Zeolite Softeners 87
- The Purpose of Softeners 87
- How Softeners Work 88
- Monitoring Softener Performance 93
- Data Sheets 115
- Demineralizers 119
- How Demineralizers Work 121
- Monitoring Demineralizer Performance 126
- Decarbonators and Degasifiers 145
- Data Sheets 171



vi CONTENTS

CHAPTER 5: *Membrane Processes—Reverse Osmosis* 177

- Osmosis 177
- Reverse Osmosis (RO) 178
- The Purpose of Reverse Osmosis Units 179
- How Reverse Osmosis Units Work 179
- Monitoring Reverse Osmosis Units 192
- Other Semi-permeable Membranes 204
- Common Operating Problems 211
- Data Sheets 217

References 223

Index 225