
CONTENTS

| | |
|--|------------|
| PREFACE | xi |
| INTRODUCTION | 1 |
| 1 AIR POLLUTION HISTORY | 9 |
| 2 AIR POLLUTION REGULATORY FRAMEWORK | 15 |
| 2.1 Introduction | 15 |
| 2.2 The Regulatory System | 16 |
| 2.3 Laws and Regulations: The Differences | 17 |
| 2.4 The Clean Air Act | 19 |
| 2.5 Provisions Relating to Enforcement | 25 |
| 2.6 Closing Comments and Recent Developments | 26 |
| 3 FUNDAMENTALS: GASES | 27 |
| 3.1 Introduction | 27 |
| 3.2 Measurement Fundamentals | 27 |
| 3.3 Chemical and Physical Properties | 29 |
| 3.4 Ideal Gas Law | 37 |
| 3.5 Phase Equilibrium | 41 |
| 3.6 Conservation Laws | 42 |
| Problems | 44 |
| 4 INCINERATORS | 69 |
| 4.1 Introduction | 69 |
| 4.2 Design and Performance Equations | 79 |
| 4.3 Operation and Maintenance, and Improving Performance | 84 |
| Problems | 86 |
| 5 ABSORBERS | 127 |
| 5.1 Introduction | 127 |
| 5.2 Design and Performance Equations | 131 |
| 5.3 Operation and Maintenance, and Improving Performance | 142 |
| Problems | 143 |

| | | |
|-----------|--|------------|
| 6 | ADSORBERS | 185 |
| 6.1 | Introduction | 185 |
| 6.2 | Design and Performance Equations | 194 |
| 6.3 | Operation and Maintenance, and Improving Performance | 201 |
| | Problems | 202 |
| 7 | FUNDAMENTALS: PARTICULATES | 247 |
| 7.1 | Introduction | 247 |
| 7.2 | Particle Collection Mechanisms | 249 |
| 7.3 | Fluid–Particle Dynamics | 252 |
| 7.4 | Particle Sizing and Measurement Methods | 260 |
| 7.5 | Particle Size Distribution | 262 |
| 7.6 | Collection Efficiency | 267 |
| | Problems | 271 |
| 8 | GRAVITY SETTLING CHAMBERS | 315 |
| 8.1 | Introduction | 315 |
| 8.2 | Design and Performance Equations | 319 |
| 8.3 | Operation and Maintenance, and Improving Performance | 324 |
| | Problems | 325 |
| 9 | CYCLONES | 361 |
| 9.1 | Introduction | 361 |
| 9.2 | Design and Performance Equations | 367 |
| 9.3 | Operation and Maintenance, and Improving Performance | 374 |
| | Problems | 376 |
| 10 | ELECTROSTATIC PRECIPITATORS | 399 |
| 10.1 | Introduction | 399 |
| 10.2 | Design and Performance Equations | 406 |
| 10.3 | Operation and Maintenance, and Improving Performance | 410 |
| | Problems | 415 |
| 11 | VENTURI SCRUBBERS | 451 |
| 11.1 | Introduction | 451 |
| 11.2 | Design and Performance Equations | 455 |
| 11.3 | Operation and Maintenance, and Improving Performance | 459 |
| | Problems | 462 |

| | |
|--|------------|
| 12 BAGHOUSES | 503 |
| 12.1 Introduction | 503 |
| 12.2 Design and Performance Equations | 506 |
| 12.3 Operation and Maintenance, and Improving Performance Problems | 511 |
| | 514 |
| APPENDIX A HYBRID SYSTEMS | 549 |
| A.1 Introduction | 549 |
| A.2 Wet Electrostatic Precipitators | 550 |
| A.3 Ionizing Wet Scrubbers | 550 |
| A.4 Dry Scrubbers | 551 |
| A.5 Electrostatically Augmented Fabric Filtration | 552 |
| APPENDIX B SI UNITS | 555 |
| B.1 The Metric System | 555 |
| B.2 The SI System | 557 |
| B.3 SI Multiples and Prefixes | 557 |
| B.4 Conversion Constants (SI) | 558 |
| APPENDIX C EQUIPMENT COST MODEL | 563 |
| INDEX | 567 |

NOTE

Additional problems for Chapters 3–12 are available for all readers at www.wiley.com. The problems may be used for homework purposes. Solutions to these problems plus six exams (three for each year or semester) are available to those who adopt the text for instructional purposes. Visit www.wiley.com and follow links for this title for details.