

Contents

Acknowledgments	ix	Cast Iron Fittings 38	
Preface	x	Plastic Fittings 38	
About the Authors	xi	Review Quiz 39	
Chapter 1		Exercise Information 40	
Overview of Pipe Drafting and Design	1	Chapter 3 Drawing Exercises 41	
Types of Projects 1		Chapter 4	
Employers of Pipe Drafters and Designers 1		Flange Basics	48
Engineering and Construction Companies 1		Rating Flanges 48	
Operating Companies 2		Flange Facings 48	
Architectural Engineering Companies 2		Flange Types 50	
Construction Companies 2		Bolts 57	
Fabrication Companies 2		Gaskets 57	
Preparation for Piping Drafting 2		Review Quiz 61	
Technical Skills 3		Exercise Information 63	
Personal Skills 3		Chapter 4 Drawing Exercises 65	
Creation of Pipe Drawings 3		Chapter 5	
Chapter 2		Valves	69
Steel Pipe	4	What Is a Valve? 69	
History of Pipe 4		Common Valve Types 70	
Piping Materials 4		Valve Operators 81	
Manufacturing Methods 4		Review Quiz 82	
Sizing of Pipe 5		Chapter 5 Drawing Exercises 86	
Wall Thickness 6		Chapter 6	
Methods of Joining Pipe 6		Mechanical Equipment	90
Cast Iron Pipe 8		Types of Equipment 90	
Plastic Pipe 10		Equipment in Use 100	
Drawing Pipe 10		Equipment Terminology 101	
Review Quiz 12		Vendor Data Drawings 103	
Chapter 3		Drawing Equipment 103	
Pipe Fittings	13	Review Quiz 108	
90° Elbows 13		Chapter 6 Drawing Exercises 110	
45° Elbows 19		Chapter 7	
Weld Tee 22		Flow Diagrams and Instrumentation	111
The Stub-In 26		Uses of Flow Diagrams 111	
Coupling 27		Type of Flow Diagrams 111	
Reducers 28		Flow Diagram Instruments 114	
Weld Cap 31		Piping Symbols 117	
Use of Fittings 31		Flow Plan Arrangement 117	
Screwed and Socket-Weld Fittings 33		Review Quiz 118	
Pipe Nipples 33		Exercise Information 119	
Flanged Fittings 37		Chapter 7 Drawing Exercises 120	

Chapter 8	
Codes and Specifications _____	123
Codes	123
Specifications	123
Specification Classes	125
Abbreviations	126
Piping Abbreviations	126
Review Quiz	132
Chapter 9	
Equipment Layout _____	133
Plant Coordinate Systems	133
Site Plans	136
Unit Plot Plan	136
Equipment Location Drawing	136
Foundation Location Drawing	136
Piping Drawing Index	141
Review Quiz	142
Chapter 10	
Piping Arrangement Drawings, Sections, and Elevations _____	143
Arrangement Drawings	143
Responsibilities of the Piping Designer	143
Information Sources for Piping Arrangement Drawings	143
Layout Procedures	144
Piping Arrangement Drawing Layout	144
Dimensioning	186
Piping Sections and Elevations: What Are They?	187
Detail Drawings	188
Review Quiz	192
Exercises: Plans, Elevations, and Sections	193
Chapter 11	
Standard Piping Details _____	194
Pipe Rack Spacing	194
Drawing Pipe in the Rack	194
Pipe Flexibility	195
Planning for Heat Expansion	197
Pipe Anchors	198
Pipe Insulation Shoes	198
Pipe Guides	198
Field Supports	199
Dummy Supports	200
Hanger Rods	200
Spring Hangers	201
Pick-up Pipe Supports	201
Review Quiz	202
Chapter 12	
Piping Systems _____	203
Plant Utilities	203
Control Valve Manifolds	204
Utility Stations	206
Meter Runs	206
Sewer and Underground Piping Systems	207
Review Quiz	209
Chapter 13	
Piping Isometrics _____	210
What Is an Isometric?	210
Drawing Piping Isometrics	216
Isometric Dimensions, Notes, and Callouts	218
Isometric Offsets	219
Review Quiz	226
Drawing Exercises	227
Chapter 14	
Customizing AutoCAD _____	231
Creating Command Aliases	231
Using AutoLisp	232
Review Quiz	236
Chapter 15	
Three-dimensional Modeling of Piping Systems _____	237
Advantages of 3D Modeling	237
Checking for Interferences	237
Generating Drawings Automatically from a Model	241
Generating Isometric Drawings Automatically	241
Computer-Aided Engineering of Models	241
Choosing a Modeling Software Package	241
Building a 3D Model Using AutoPlant	242
Appendix A	
Dimensional Data _____	256
Appendix B	
Review of Lettering _____	292
Appendix C	
Alphabet of Lines _____	294
Appendix D	
Review of Math _____	295
Appendix E	
Use of the Calculator _____	296
Appendix F	
Architect's Scale _____	299
Glossary _____	300
Index _____	308