

CONTENTS

Chapter 1	Carbon and low alloy steels	1
1.1	Low carbon steels (mild steel)	1
1.2	Limitations of mild steel	3
1.3	High carbon steels	7
1.4	Low carbon low alloy steels	8
1.5	High carbon low alloy steels	13
1.6	References	14
Chapter 2	High alloy steels	16
2.1	Chromium steels (400 series)	16
2.2	Chromium/nickel austenitic steels (300 series)	19
2.3	Precipitation hardening stainless steels	21
2.4	Chromium /nickel ferrite/ austenite steels	22
2.5	Maraging steels	23
2.6	properties and applications	23
2.7	References	27
Chapter 3	Pressure vessel design codes	29
3.1	Definitions of pressure vessels	29
3.2	Specification of materials	32
3.3	Criteria for design stresses	32
3.4	Effect of design criteria on costs	33
3.5	References	35
Chapter 4	Cast iron	36
4.1	General description	36
4.2	Types of cast iron	36
4.3	Specific applicational requirements	43
4.4	References	47
Chapter 5	Nickel and nickel alloys	48
5.1	Corrosion resistant alloys	48
5.2	Heat resistant alloys	51
5.3	References	53

Chapter 6	Copper and copper alloys	54
6.1	Principal alloys	55
6.2	Corrosion resistance	60
6.3	Fabrication	61
6.4	References	61
Chapter 7	Lead and lead alloys	62
7.1	Lead specifications	62
7.2	Mechanical properties	63
7.3	Forms available	64
7.4	Fabrication techniques	65
7.5	References	65
Chapter 8	Aluminium and aluminium alloys	67
8.1	Aluminium alloy compositions	68
8.2	Effect of temperature on properties	71
8.3	Fabrication	71
8.4	Corrosion resistance	72
8.5	Applications	74
8.6	References	76
Chapter 9	New metals and precious metals	77
9.1	New metals	77
9.2	Precious metals	83
9.3	References	86
Chapter 10	Carbon, graphite and glass	88
10.1	Carbon and graphite	88
10.2	Glass	89
10.3	References	92
Chapter 11	Cements, bricks and tiles	94
11.1	Hydraulic cements	94
11.2	Brick- and tile-lined vessels and floors	95
11.3	References	98
Chapter 12	Plastics—thermoplastics	99
12.1	Corrosion resistance	100
12.2	Mechanical properties	100
12.3	Raw material and conversion costs	101

12.4 Polyolefins	101
12.5 PVC [poly (vinyl chloride)]	107
12.6 Acrylonitrile-butadiene-styrene (ABS)	109
12.7 Fluorinated plastics	110
12.8 Acrylics	111
12.9 Chlorinated polyether	112
12.10 Nylon (polyamide)	112
12.11 Other engineering plastics	114
12.12 References	115
Chapter 13 Plastics – thermosetting	117
13.1 Phenolic resins	118
13.2 Polyester resins	118
13.3 Epoxy resins	121
13.4 Furane resins	121
13.5 Vinyl ester (Derakane)	122
13.6 References	122
Chapter 14 Rubber linings	123
14.1 Chemical resistance of natural and synthetic rubbers	123
14.2 Evaluation of rubber compounds	124
14.3 Lining techniques	125
14.4 Inspection	126
14.5 References	126
Chapter 15 Metallic coatings	128
15.1 Electro-deposition	128
15.2 Dip coatings	129
15.3 Sprayed coatings	131
15.4 Diffusion coatings	132
15.5 References	133
Chapter 16 Organic coatings	135
16.1 Paints for prevention of corrosion by atmospheric pollution	135
16.2 Chemical resistant paints	138
16.3 Coatings for immersion in process liquors	139
16.4 References	143

Chapter 17	Costs of materials	145
17.1	Metal plate and castings	145
17.2	Plastics	147
17.3	Metal and plastic pipe	149
17.4	References	150
Appendix A	Trade names of thermoplastics	151
Appendix B	Trade names of thermosetting resins	153
Appendix C	Addresses of major plastics manufacturers	154
Index		157