

Contents

Introduction	4
1 Metal casting processes	5
1.1 Introduction	5
1.2 Patterns	10
1.3 Moulding materials	18
1.4 Basic moulding and core making techniques	27
1.5 Casting alloys	33
1.6 Foundry properties	54
1.7 Design considerations	65
1.8 Further production techniques	74
2 Metal forming	84
2.1 Separating	91
2.2 Bending	97
2.3 Methods for producing hollow parts	102
2.4. Formability	110
2.5. Equipment	115
3 Bulk metal forming	117
3.1 Criteria used for classification	117
3.2 Basic forging techniques	120
3.3 Basic performing operations in metal forming	128
3.4 Additional operations used in bulk metal forming	132
3.5 Forming parameters calculation	140
3.6 Forming machines	144
3.7 Powder metallurgy	153
4 Welding	160
4.1 Basic welding processes	162
4.2 Arc welding	163
4.3 Resistance welding	173
4.4 Other welding processes	177
4.5 Metallurgy of welds and weldability	179
4.6 Brazing and soldering	186
4.7 Thermal cutting	191
4.8 Inspection of welded joints	201
5 Processing of polymers	207
5.1 Thermoplastics processing	207
5.2 Thermosetting plastics processing	210
6 Composite processing methods	211
7 Surface coating	221
7.1 Corrosion	221
7.2 Cleaning	223
7.3 Types of finishes	224
Literature	230