

CONTENTS

Preface

1	INTRODUCTION	1
1.1.	Using the handbook	1
1.2.	The classification of adhesives	1
1.3.	Background to the use of adhesive bonding	3
1.4.	Factors determining whether to bond with adhesives	4
1.5.	Advantages and disadvantages of adhesive bonding	5
1.6.	The bonding process	6
2	JOINT DESIGN	7
2.1.	Types of stresses	7
2.2.	Types of joints	8
2.3.	Selection of joint detail	8
2.4.	Joint design criteria	18
2.4.1.	Dimensions of adhesive bonded joints	19
2.4.2.	Determination of joint size required	20
3	ADHESIVE SELECTION	21
3.1.	Introduction	21
3.2.	Requirements of bonded assembly	22
3.3.	Materials to be bonded	23
3.4.	Compatibility of adherends and adhesives	24
3.5.	Bond stresses	24
3.6.	Processing requirements	24
3.7.	Service conditions	25
3.8.	Service life	26
3.9.	Assembly storage conditions	26
3.10.	Cost	26
3.11.	Special considerations	26
3.12.	Checklist of factors for adhesive selection	27

4	ADHESIVES MATERIALS AND PROPERTIES	28
4.1.	The components of an adhesive	28
4.2.	Adhesives types	29
4.2.1.	Thermoplastic adhesives	29
4.2.2.	Thermosetting adhesives	29
4.2.3.	Rubber-resin blends	30
4.3.	Properties of basic adhesive types	31
5	ADHESIVE PRODUCTS DIRECTORY	78
5.1.	Introduction	78
5.2.	Adhesive products tables	78
6	SURFACE PREPARATION	235
6.1.	Introduction	235
6.2.	Safety precautions	235
6.3.	Surface treatment	235
6.4.	Metals	236
6.5.	Plastics	244
6.6.	Rubbers (natural and synthetic)	250
6.7.	Fibre products	252
6.8.	Inorganic materials	253
6.9.	Wood and allied materials	255
6.10.	Painted surfaces	256
7	THE BONDING PROCESS	258
7.1.	Storage	258
7.2.	Preparation of the adhesive	258
7.3.	Methods of application	258
7.3.1.	Brushing	258
7.3.2.	Flowing	258
7.3.3.	Spraying	259
7.3.4.	Roll coating	259
7.3.5.	Knife coating	259
7.3.6.	Silk screening	259
7.3.7.	Melting	259
7.4.	Methods of adhesive bonding	259
7.4.1.	Wet bonding	259
7.4.2.	Reactivation bonding	259
7.4.3.	Pressure-sensitive bonding	260
7.4.4.	Curing	260
7.4.5.	Other methods of bonding	260
7.5.	Inadequate bonding	260

7.6.	Methods of bond curing	261
7.6.1.	Direct heat curing	261
7.6.2.	Radiation curing	261
7.6.3.	Electric heaters	261
7.6.4.	High frequency (radio-frequency) dielectric heating	262
7.6.5.	Induction heating	263
7.6.6.	Low-voltage electric heating	263
7.6.7.	Ultrasonic activation	263
7.7.	Bonding pressure	263
7.8.	Equipment for processing adhesives	264
7.8.1.	Plant and processing equipment index	265
7.8.2.	Manufacturers and addresses	265
8	PHYSICAL TESTING OF ADHESIVES	268
8.1.	Introduction	268
8.2.	Strength properties	268
8.3.	Assessment of durability and strength parameters	274
8.3.1.	Fatigue	274
8.3.2.	Creep	274
8.3.3.	Flexural strength	275
8.3.4.	Peel strength	275
8.3.5.	Durability	275
8.3.6.	Non-destructive testing	276
8.3.7.	Standard test methods	277
9	ADHESIVES TABLES	284
9.1.	Introduction	284
9.2.	Physical properties of adhesive materials	284
10	ADHESIVES AND TRADE SOURCES	318
10.1.	Trade names list	318
10.2.	Basic adhesives types and trade sources	330
10.3.	Adhesives manufacturers	332
10.4.	Sources of further information on adhesives	340
11	GLOSSARY OF TERMS RELATING TO ADHESIVES TECHNOLOGY	343
12	BIBLIOGRAPHY	354