

## Index

### a

- A-B Process, 2K acrylic adhesives 260
- abrasive fleece hand pads 242
- abrasive grit 111
- accelerated aging methods 235
- acetate systems 144
- acidic cleaners 108
- acrylic-based PSAs 184, 186
- acrylic foam tapes 18, 19, 187
- acrylic PSAs 180
- acrylonitrile butadiene rubber (ABR) 170
- acrylonitrile butadiene styrene (ABS) 36, 90
- $\alpha$ -cyano-acrylic acid ester 134
- additives 104
- adhesion build-up process
  - adhesive preparation 326
    - delivery and application 331–340
    - homogenization 327
    - room humidity setting 330–331
    - viscosity 327–330
  - surface treatment of substrates 326
- adhesion destructive 99
- adhesion failure (AF) 206
- adhesion to surface 26–28
- adhesive bonding 1, 2, 21, 31, 104
  - advantages and disadvantages of 33–36
  - applications 40, 41
    - all-purpose adhesives 42–43
    - all-rounders for structural 43–44
    - easy to use hotmelt adhesives 41–42
    - high-speed cyanoacrylate adhesives 41
    - PSA tapes for quick connect and disconnect 46
    - self-adhesive products 45
    - strong PSA tape for all cases 47
    - user-friendly comformable
      - high-performance PSA foam tapes 44–45
  - bearing capacity 223
  - customer requirements for 352
  - glass 207
  - glass bonds 4–5
  - industry and craft 6
  - limitations of 32
  - loads 214
    - environmental loads 219–221
    - failure of 215
      - mechanical loads 215–219
  - long-term behavior of 214–215
  - main tasks 129
  - metal bonds 2–4
  - metals 196
  - in nature 7
  - performance of standard adhesives 32–33
  - plastic bonds 4
  - plastic materials 204–205
  - plastics property 206
  - roles in production today 31
  - structural and elastic bonding 36–40
  - technology
    - 1845–1930 10–14
    - 1930–1960 14–18
      - first adhesives 9–10
      - since 1960 18–20
    - wood 210
    - wood bonds 5
- adhesive components 55
  - batch processing 341–342
  - dynamic mixing 345
  - static mixing 342
- adhesive market development 351–352
- adhesive preparation 107, 178, 324, 326–331
- adhesive processing 172, 227, 324, 325, 352
- adhesives 1, 129
  - bonding process 222
  - curing mechanism 130–131
  - 1K adhesive systems 132
    - anaerobic adhesives 161–164
    - cyanoacrylate adhesives 133–137
    - hotmelt adhesives 146–155
    - 1K epoxy adhesive 164–169
    - 1K PU adhesives 137–143

- adhesives (*contd.*)
- 1K silicone adhesives 143–146
  - photoinitiated adhesives 155–161
  - pressure sensitive adhesives 174–189
  - solvent-borne and dispersion adhesives 169–174
  - 2K adhesive systems 189
    - 2K acrylate adhesives 193–195
    - 2K epoxy adhesives 190–193
    - 2K PU adhesives 195–196
  - number of components 132
  - remarkable properties 133
  - requirements 224–225
  - shear properties 286
  - strength 130
  - thermomechanical properties 281–286
  - adhesive specification 228
  - adhesive requirements 224–225
    - loads on joint 223–224
    - manufacturing process 226–228
    - parameters relevant 222
    - practical guidelines 229
    - substrate 223
    - successful preparation 222
    - surface treatment method 225–226
  - adhesive strength 224, 265
  - ageing conditions for adhesive bonds 263
    - cataplasma test 274
    - climate change test 272–273
    - climate test 272
    - climatic corrosion test 273
    - fracture surface evaluation 274–275
    - immersion test 272
    - outdoor weathering test 274
    - salt spray test 273
  - alcohols 107
  - aliphatic hydrocarbons 107, 178
  - alkaline cleaners 108
  - alkoxy groups, coupling agent 209
  - alkoxy propanols 107
  - Allcock's Porous Plaster 10
  - Allcock, Thomas 10
  - all-purpose adhesive 11, 14, 15, 42–43
  - alternating copolymer 79
  - aluminum 74, 102
    - applications of 75
    - oxide 111
    - properties of 74
    - resistance of 74–75
    - strength of 74
    - surface improvement 75–76
    - surfaces bonding 202
    - surface treatment 202–203
  - amine systems 144
  - anaerobic adhesives 17, 249
    - applications 163–164
    - chemistry/ composition 161–162
    - curing/processing 162–163
    - overview 161
    - processing profile 249
    - profile of 164
    - properties 163
  - animal hides (glutin glue) 9
  - anodic treatment process 75, 203
  - anodizing 117
  - application-oriented adhesive classifications 351
  - aqueous cleaners 104, 108, 109
  - aqueous systems 108, 109
  - Araldit 194 17
  - atmospheric plasma activation 243
  - atmospheric plasma treatment 122–124
- b**
- Bakelite 15
  - bearing capacity 230
  - Beiersdorf, Paul Carl 11, 12
  - bending loads, on adhesive bonds 306
  - birch tar 9, 10
  - bisphenol A 165, 182
  - blasting of material surfaces 113
    - cryogenic blasting 114
    - equipment 113–114
    - SACO 114
  - blasting process, for bonded joint production 243
  - block copolymer 79, 147, 178
  - bonded joint 1
  - bonded joints production 236
    - adhesion build-up process 326–340
    - adhesive preparation 241
    - cohesion build-up process 340–348
    - execution of 241
      - with 1K adhesives 244–256
      - surface treatment 241–244
      - two-component adhesives 256–263
    - personal protective equipment, provision of 237–240
    - preliminary requirements 236
    - process objectives 325–326
    - workplace preparation 239–240
  - bond line corrosion 221
  - bond wound closure, with hot melt adhesives 369
  - booster systems 140
  - boron nitride 111
  - borosilicate glass 94
  - branched polymers 80, 81
  - brushing 111
  - burger model 84
  - butt bonding 204

**C**

- cast iron 67, 68
- cast steel 67
- cataplasma test 274
- chain polymerization 78
- chemical bridges 209
- chemically curing systems 347, 348
- chemical surface treatment
  - anodizing 117
  - chromating 117
  - conversion layer 116
  - gas phase treatment 117
  - phosphates 116–117
  - pickling of substrates 116
- chloroprene rubber (CR) 170
- chromating 117
- chromium deposition method 73
- cleavage loads, on adhesive joints 306–307
- cleavage test 270
- client 60
- climate change test 272–273
- climatic corrosion test 273
- cohesion 97
- cohesion build-up process
  - adhesive component mixing 341–345
  - curing of adhesive layer 346–348
  - joining and fixation of bond 346
- cohesion of an adhesive layer 29
- cohesive 98
- color-coding method 54
- contact adhesive bonding 43
- contact adhesive processing 172
- contact bonding 254
- contact corrosion 221
- contemporary adhesive bonding
  - applications 351
  - high-performance acrylic foam tapes 366–368
  - inductively curing adhesives 363–365
  - in lightweight construction 352–355
  - low-energy plastics 357–360
  - modern facade construction 355–357
  - skin-friendly hotmelt adhesives 369
  - structural 2K adhesives 360–363
- Coover, Harry 18
- copolymers 79, 81, 146, 170, 171, 175, 178
- copper 102
- corrosion resistance 34, 70–73, 168, 225
- corundum 111
- coupling agents 209
- crash-resistant 2K adhesives, light weight bonding with 353
- creep behavior, of adhesive bond 289–292
- creep corrosion 221
- creep resistance 225
- crepe tape 13
- critical surface tension 24
- cross-linked PS (PS-X) 88
- cryogenic blasting 114
- curing
  - of adhesive layer 346
  - conditions 227
  - 1K adhesives
    - anaerobic adhesives 249
    - cyanoacrylate adhesives 245
    - dispersion adhesives 255–256
    - epoxy adhesives 249–250
    - hotmelt adhesives 250–251
    - photo-initiated adhesives 251–252
    - PU adhesives 247
    - silicone adhesives 247–248
    - solvent-based adhesives 253–254
  - of 2K epoxy adhesives 260
  - mechanism
    - adhesive classification 131
    - chemically curing adhesives 131–132
    - physically curing adhesives 130–131
- cyanoacrylate adhesives 18, 41, 42
  - applications 135–136
  - chemistry/composition 133–134
  - curing 245–246
  - curing/processing 134
  - dosage form 245
  - ester groups 135
  - medical applications 136
  - overview 133
  - processing profile 245–246
  - profile 137
  - properties 134

**d**

- Dahlquist criterion 176, 285
- Day, Horace 10
- design, of adhesive bonds 296
  - adhesive bond utilization factor  $\delta$  300–301
  - adhesive layer thickness, influence of 303–304
  - avoiding stress peaks 304
    - bending loads 306
    - cleavage loads 306–307
    - peel loads 305–306
    - plastic deformation, of substrates 307
  - bonded joints 307–309
  - bonding area, influence of 302–303
  - butt joints 297–298
  - optimal overlap length 299–300
  - overlap length, influence of 301
  - requirements 296
  - single lap joints 298–299
  - single lap joints, optimization of 299–300

- design, of adhesive bonds (*contd.*)  
 substrate thickness, influence of 301–302  
 substrate width, influence of 302–303  
 sufficient bonding area, provision of 297
- development step  
 completion, requirements for 323  
 goal of 235  
 major tasks and accomplishments 321, 322  
 objectives 321–323  
 project status 321  
 tasks and accomplishments 350
- diamond 111
- diaphragm pump 335
- dicyandiamide 152
- Di-cyclopentadiene dioxide 165
- diethylenetriamine (DETA) 166
- differential scanning calorimetry (DSC) 276
- diffusion bonding 254
- dimensioning of bonded joints  
 bond strength 309  
 elastic adhesive bonds 310–312  
 element for interior design 315–317  
 factors influencing 308  
 glass pane with an aluminum frame 317–319  
 with plastics 312–313  
 reduction factors 309–310  
 shear strength 308  
 stainless-steel plates example 313–315
- DIN 2304 52, 56  
 quality standard 55  
 safety classes 63
- dispersion adhesives 43, 255
- dispersion contact adhesives 170
- dispersion forces 26, 27, 29, 81
- dispersive interactions 24, 177
- dosage form  
 1K adhesives  
 anaerobic adhesives 249  
 cyanoacrylate adhesives 244–245  
 epoxy adhesives 249–250  
 hotmelt adhesives 250–251  
 photo-initiated adhesives 251–252  
 pressure sensitive adhesives 252  
 PU adhesives 246–247  
 silicone adhesives 247–248  
 solvent-based adhesives 253–254
- 2K adhesives  
 acrylic adhesives 260–263  
 epoxy adhesives 258–260
- Drew, Richard 13, 14
- dry bonding 43
- dry processing 172, 174
- dual-curing adhesives 159
- Duct Tape 16, 17, 47
- dynamic mechanical thermal analysis (DMTA) 276–279
- dynamic overlap shear test 265
- dynamic viscosity 82, 327, 328
- e**
- Eastman 910* 18, 133
- eccentric screw pump 335
- elastic adhesive bonds 281, 311
- elastic bonding 39  
 for heavier loads 39–40  
 main tasks in 39
- elastic deformation 292
- elastic polycaprolactone-based hotmelt adhesive 369
- elastomers polymer 81
- environmental loads  
 bond line corrosion 220  
 contact corrosion 221  
 corrosive media impact 220–221  
 creep corrosion 221  
 stress crack corrosion 221  
 temperature changes 219–220  
 water diffusion 220
- environmental protection and occupational safety 227
- EPDM seal 136
- epoxy adhesives  
 1K adhesives 249–250  
 2k adhesives 258–260
- esters 107
- ethylene-propylene-diene rubber (EPDM) 41
- f**
- face surface 96
- fast initial strengths 229
- feasibility step 235, 236
- ferrous materials 67  
 classification 68  
 mechanical properties 68–69  
 steel classification 69–71  
 steel surface improvement 71–74
- fiber-reinforced birch tar glue 9
- final strength 260
- fingerprint spectra 280
- finite element analysis (FEA) 307
- Fischer, August 14
- fixed nozzle system 337
- flame-retardant acrylic foam tapes 367
- fluor rubber (FPM) 41
- foamed PS (PS-E) 87
- foreign substances 105
- Fourier transform infrared spectroscopy 280
- fracture surface evaluation 274–275

full-surface applications of adhesives 339  
 brushing, troweling and squeegeeing 339  
 PSA film lamination 340  
 roller application method 340  
 spray application 339

## **g**

galvanic zinc coating 72  
 galvanized steel bonding 199–200  
 galvanized steels 101  
 gatekeeper 54  
 gate reviews 53–55  
 gear pumps 334  
 gel point 259  
 general purpose PS (GPPS) 87  
 glasses 66, 105  
   adhesive bonding 207  
   adhesives bonding 210  
   bonds 4–5  
   classification of 94  
   corrosion 5, 208  
   long-term resistance bonding 208  
   manufacture of 94  
   quartz crystal 93  
   surface treatment 208  
   transition temperature 282  
 glass-fiber-reinforced plastic (GFRP) 36  
 glue cooking 9  
 good adhesion 2, 3, 21, 26, 73, 97, 102, 118, 171, 174  
 good cohesion 2, 21, 164  
 gradient copolymer 79  
 graft copolymer 79  
 grinding 111–113

## **h**

halogenated hydrocarbons 107  
 hand strength 260  
 Hansaplast 13  
 high-alloy steel 69  
 high-density (HD-PE) 85  
 high-energy plastics 103  
 high-grade steel 70  
 high-performance acrylic foam tapes 366–368  
   bonding of touchscreens 368  
   characteristics and properties of 366  
   for powder coating process 366–367  
   user benefits 366  
   visually demanding application 367–368  
 high-performance plastics 76  
 high-quality adhesive bonding 96  
 high-quality bonded joint production 295  
 high strength fasteners 46  
 hook and loop fasteners 46  
 hot dip galvanized steel railing 199

hot dip galvanizing process 73  
 hotmelt adhesives 146–148, 212, 250–251  
   advantages 151  
   applications 153–155  
   bottles and containers 153–154  
   chemistry/ composition 146–148  
   curing hot melt adhesives 151–153  
   curing/processing 148–149  
   disadvantages 151  
   heat shrinkable tubing 154  
   overview 146  
   profile 154–155  
   properties 151  
   wood bonding applications 154  
 hybrid bonding processes 20  
 hydrocarbon tackifiers 181  
 hydrogen bonds 26

## **i**

immersion degreasing 110  
 immersion test 272  
 impact-resistant PS (PS-I) 88  
 induced dipoles 26  
 inductively curing adhesives  
   advantages of 363–364  
   innovative manufacturing concepts 365  
   user benefits 364–365  
 intermolecular interactions 26  
 internal strength 29  
 joining part fixation 227  
 ISO 9001 quality standard 50

## **k**

Kelvin-Voigt model 83  
 Kenics and Sulzer mixers 342  
 ketones 107

## **l**

laminating method 339  
 lead glass 94  
 Leukoplast 12, 13  
 Lifschütz, Isaac 12  
 lightweight construction, bonding applications in 352  
 Linear-elastic behavior 82  
 linear-low density (LLD-PE) 85  
 linear polymers 80  
 liquid adhesives 161  
 load bearing capacity 230, 310  
 load-carrying capacity 230  
 loads, adhesive bonding  
   environmental loads  
     bond line corrosion 220  
     contact corrosion 221  
     corrosive media impact 220–221

loads, adhesive bonding (*contd.*)  
 creep corrosion 221  
 stress crack corrosion 221  
 temperature changes 219–220  
 water diffusion 220  
 mechanical loads  
 external loads 215  
 internal loads 215–219  
 London forces 27  
 long term aging-resistant bonds 203–204  
 low-alloy steel 69  
 low-density (LD-PE) 85  
 low-energy plastics 103  
 low-energy surfaces, structural adhesives for 359  
 low-pressure plasma process 122  
 low steel 101

## **m**

3M 13, 18  
 macromolecules 78  
 manual hot melt adhesive gun 148  
 manual processing, of 2K epoxy adhesives 256  
 masking tape 13  
 maxwell model 83  
 mechanical loads 224  
 external loads 215  
 internal loads 215  
 dissimilar substrates 217–218  
 possible damage 217  
 shrinkage of, adhesive layer 218–219  
 similar substrates 216–217  
 mechanical surface treatment  
 blasting 113–115  
 grinding and brushing 111–113  
 metals 64  
 aluminum surfaces bonding 202  
 aluminum surface treatment 202–203  
 atomic structure 65  
 bonds 2–4  
 galvanized steel bonding 199–200  
 long term aging-resistant bonds 203–204  
 multi-layered structure 196–197  
 oily steel sheet bonding 198  
 stainless steel bonding 200–201  
 steel sheet bonding 197–198  
 steel surfaces, adhesive bonding 197  
 surface structure 100–102  
 metering system, functional units of 332  
 metering units 332  
 methyl ethyl ketone (MEK) 107  
 micro-Brownian motions 283  
 modern plastics 358  
 moving nozzle system 336  
 Mussels adhesive bond 6

## **n**

natural rubber PSAs 176  
 needle valves 336  
 neutral cleaners 108  
 neutral systems 144  
 Newtonian fluids 328  
 no-mix process 261  
 non-alloy steel 69  
 non-Newtonian fluids 328

## **o**

OH-terminated poly-siloxanes 143  
 oily steel sheet bonding 198  
 oligomers 78  
 1K adhesives, bonded joints with  
 activation 244  
 anaerobic adhesives 249  
 cyanoacrylate adhesives 244–246  
 dispersion adhesives 255–256  
 epoxy adhesives 249–250  
 hotmelt adhesives 250–251  
 photo-initiated adhesives 251–252  
 pressure-sensitive adhesives 252–253  
 PU adhesives 246–247  
 shelf life 244  
 silicone adhesives 247–248  
 solvent-based adhesives 253–254  
 1K adhesive systems  
 anaerobic adhesives 161–164  
 cyanoacrylate adhesives 133–137  
 hotmelt adhesives 146–155  
 1K epoxy adhesive 164–169  
 1K PU adhesives 137–143  
 1K silicone adhesives 143–146  
 photoinitiated adhesives 155–161  
 pressure sensitive adhesives 174–189  
 solvent-borne and dispersion adhesives 169–174  
 1K epoxy adhesives 20  
 addition polymerization 166–167  
 advantages and disadvantages 168  
 applications 168–169  
 chemistry/composition 164–165  
 curing/processing 167  
 epoxy resins 167  
 overview 164  
 profile of 169  
 properties 167–168  
 1K PU adhesives  
 applications 140–142  
 chemistry/ composition 137–139  
 curing/processing 139–140  
 overview 137  
 profile of 142–143  
 properties 140

- 1K silicone adhesives (RTV-1)
  - applications 145
  - chemistry 143–144
  - curing/processing 144
  - overview 143
  - profile of 146
  - properties 145
- operating staff 62
- organic solvents 105–110
- outdoor weathering test 274
- oxime-releasing adhesives 144
  
- p**
- partial-surface application methods for adhesives 338
  - bead application 337–338
  - PSA tape lamination 339
  - screen printing application 338
  - spot application 337–338
- peel loads, on adhesive bonds 305–306
- peel tests 268–269
- peristaltic pump 335
- permanent dipoles 26
- phosphate deposition process 73
- photoinitiated acrylic adhesives 158
- photoinitiated adhesives
  - applications 159–160
  - cationic curing systems 156–157
  - chemistry/composition 155–167
  - curing/processing 157–159
  - overview 155
  - profile of 160–161
  - properties 159
  - radical curing systems 155–156
- photo-initiated adhesives 251–252
- photoinitiated epoxy adhesives 158
- physically curing systems 347
- physical surface treatment
  - corona treatment 119–120
  - flame treatment 118–125
  - laser treatment 125
  - overview of 126
  - plasma process 120–121
  - Pyrosil® flame coating 119
- physical test methods, for adhesive bonds 263, 275
  - differential scanning calorimetry 276
  - dynamic mechanical thermal analysis 276–279
  - Fourier transform infrared spectroscopy 280
  - thermo gravimetric analysis 279–280
- pickling process surface treatment 203
- pinch valves 336
- piston pump 334
- plasma process
  - atmospheric plasma treatment 122–124
  - low pressure plasma treatment 121–122
  - plasma cleaning 124
  - plasma polymerization 124
  - plastic surfaces 121
- plastic bonds 4
- plastic deformation 292
- plastic deformation of substrates 307
- plasticized PVC (P-PVC) 86
- plastic materials 65
  - butt bonding 204–205
  - chemistry of 78–80
  - diffusion and solubility characteristics 205
  - industry and craft 85–93
  - long-term resistance, plastic bonding 206
  - properties 76–77
  - recycled plastic bonding 205–206
  - thermomechanical properties 80–82
  - viscoelastic properties of 82–84
- plastics 102
- polar interactions 24
- polyaddition 79
- polyaddition-curing adhesives 341
- polyamide (PA) 91
- polycarbonate (PC) 36, 89
- polycondensation 79
- polyethylene (PE) 36, 85
- polyethylene terephthalate (PET) 81, 88
- polymerization 78
- polymers
  - molecular interactions of 26–27
  - structure of 79–80
  - synthesis 78
- polymethyl methacrylate (PMMA) 36, 90
- polypropylene (PP) 36, 85
- polystyrene (PS) 86
- polytetrafluoroethylene (PTFE) 25, 205
- polyurethanes (PU) 91, 246
  - curing 247
  - foams 92
  - processing of 246–247
  - processing profile 247
- polyvinyl acetate (PVAC) 14, 89
- polyvinyl butyral (PVB) 95
- polyvinyl chloride (PVC) 36, 86
- pot life 259
- powder coating technique 358
- Preiswerk, Eduard 17
- premium steel 70
- pressure sensitive adhesives (PSA) 252–253
  - applications 185–188
  - backings 182
  - chemistry/composition 175–182
  - film lamination 340
  - new developments 188–189
  - overview 174–175

pressure sensitive adhesives (PSA) (*contd.*)

- processing 182–183
- profile 188
- properties 183–184
- tackifiers, thermomechanical effects of 286
- tackifying resins 181
- tape lamination 339
- thermomechanical properties of 284–285
- time at room temperature 177

## printable adhesives 355

## processing profile

## 1K adhesives

- cyanoacrylate adhesives 245–246
- dispersion adhesives 255–256
- epoxy adhesives 249–250
- hotmelt adhesives 250–251
- photo-initiated adhesives 251–252
- pressure sensitive adhesives 253
- PU adhesives 247
- silicone adhesives 247–248
- solvent-based adhesives 253–254

## 2K adhesives

- acrylate adhesives 262
- epoxy adhesives 260

## production process 349

## project champion 61

## project contract

- plan elements 59
- planning phase 60
- project-relevant people 60

## project management system

- development and launch 53
- DIN 2304 55
- gate reviews 53–55
- planning, concept and feasibility 52–53
- 5-step 51

## project manager 61

## project sponsor 60

## project team DIN 2304 safety classes 63

## proportional valves 336

## pumps, for adhesive delivery 334

## pure iron 67

## Pyrosil® flame coating 119

## Pyrosil® process 243

**q**

## quality assurance 228

## quality steel 70

## quartz glass 93

**r**

## recycled plastic bonding 205–206

## Redux 16

## reversible creep 290

## roller application method 340

**S**

## safe and high-quality bonds 59

## ISO 9001 quality standard 50

## project management system 51–53

## special process 49–50

## salt spray test 273

## sandblasting and coating (SACO) 114

## Scotch tape 14

## screen-printing process 338

## segin 9

## self-adhesive plaster 11

## self-adhesive transfer tapes 358, 359

## semi-crystalline polymers 80

## semi-structural PSAs 182

## shear modulus 308

## of adhesives 287

## shear properties, of adhesives 287

## creep behavior 289–292

## flow property 289

## shear modulus 287

## shear stress-strain behavior 278–288

## shear stress-strain behavior 288

## shear test 265–267, 308

## shear-thickening (dilatant) fluids 328

## shear-thinning (structural viscous) fluids 328

## Shecut, William 10

## Sichel, Ferdinand 12

## silane coupling agent 209

## silicon adhesives 247

## silicon carbide 111

## silicone adhesives 248

## silicones 99

## six sigma methodology 51, 52

## skin-friendly hotmelt adhesives 369

*Snuff Back* valves 335, 336

## soda-lime glass 94

## solvent-based adhesives 253–254

## solvent-borne adhesives 170

## solvent-borne and dispersion adhesives

## applications 173

## chemistry/composition 170–171

## curing/processing 171–172

## overview 169–170

## profile 173–174

## properties 172–173

## solvent-borne contact adhesives 170

## solvent-borne wet adhesives 170

## spin spray application 339

## spray galvanizing process 73

## stainless steel 70, 71, 101

## stainless steel bonding 200, 201

## standard glass 94

## standard2K epoxy adhesive 32

## standard steel 70

## static mixing 342

## statistical copolymer 79



- steel
    - classification 69–71
    - sheet bonding 197–198
    - surface improvement 71–74
    - surfaces, adhesive bonding 197
  - 5-step project management system 52
  - stress crack corrosion 221
  - stress cracks 104
  - stress relaxation 225
    - behavior, of adhesive layer 294
  - structural adhesive bonds 280–281
  - structural bonding 38, 39
  - Structural Bonding Tape 19
  - structural 2K adhesives
    - in art 361–362
    - 2K acrylate adhesives in advertising 362–363
    - performance, Guinness World Record 360
    - in sports 360–361
  - structural steel 70
  - structural vs. elastic bonding 312
  - styrene-acrylonitrile (SAN) 79, 90
  - styrene-butadiene rubber (SBR) 41
  - substance-bound method 33
  - substrate dependence, of shear test 267
  - substrates
    - advantages and disadvantages 129
    - definition of 223
    - surface and treatment 64
    - surface characteristics 100–105
    - surface cleaning 105–110
    - surfaces
      - aluminum 74–76
      - ferrous materials 67
      - glass 93
      - material classes 64
      - plastic materials 76–77
      - wood 95
    - surfaces treatment 96–100
    - surface treatment 110–126
  - super glues 18, 133
  - supervisor in charge (SIC) 61, 63
  - surface adhesion 26, 27, 29
  - surface cleaning
    - aqueous systems 108
    - degreasing processes 109
    - metal surfaces 108–109
    - organic solvents 105–110
    - plastic surfaces 109
  - surface contamination 99, 100, 113
  - surface energy of solids 23–25
  - surface finishing of glass 95
  - surfaces wetting 21
  - surface tension
    - of liquids 23
    - Young's equation and 21–23
  - surface treatment
    - chemical surface treatment 115–118
    - goal of 98–100
    - importance of 97
    - mechanical surface treatment 111–115
    - physical surface treatment 118–125
  - surface treatment, for bonded joint production
    - 241
    - atmospheric plasma 243
    - blasting 243
    - grinding 241–243
    - Pyrosil® process 243
  - surface treatment method 225–226
  - Syndetikon 10, 11
  - syndiotactic PP 81, 86
- t**
- technological test methods
    - for adhesive bonds 263, 264
    - cleavage test 270
    - peel test 268–270
    - shear test 265–267
    - tensile test 267–268
    - wedge test 270–272
  - tensile test 267–268, 308
  - tesafilm® 12, 15, 16
  - tetra-ethylene glycol di-methyl acrylate (TEGMA) 161
  - thermal loads 224
  - thermo gravimetric analysis (TGA) 279–280
  - thermomechanical plastic materials 80–82
  - thermomechanical properties, of adhesives
    - elastic region 283
    - flow region 283
    - glassy region 282–283
    - range of adhesives for industrial application 281–282
  - thermoplastic elastomers polymer 81
  - thermoplasts polymers 81
  - thermoset adhesive layers 159, 160, 164, 196, 281
  - thermosets polymers 81
  - thixotropy, of adhesives 330
  - three-point bending test method 270
  - time-lapse effect 215, 274
  - time-temperature superposition, principle of 279
  - titanium 74, 102, 202
  - tonnage steel 70
  - tool steel 68, 70, 71
  - transportation industry, lightweight
    - requirements in 352
  - triethylenetetramine (TETA) 166
  - Troplowitz, Oscar 12
  - truck construction, elastic bonding in 354
  - 2K acrylate adhesives 262

- 2K acrylate adhesives (*contd.*)
    - in advertising 362–363
    - applications 194–195
    - chemistry/composition 193
    - overview 193
    - processing 193–194
    - 3 process types 194
    - profiles 195
    - properties 194
  - 2K acrylic adhesives 362
  - 2K adhesive processing
    - mixing by hand 256–258
    - mixing without the mixing tube 258
    - mixing with the mixing tube 258
    - use of mixing and dispensing systems 257–258
    - using disposable mixing tubes 258
  - 2K adhesive systems
    - applications of 190
    - curing and processing 190
    - 2K acrylate adhesives 193–195
    - 2K epoxy adhesives 190–193
    - 2K PU adhesives 195–196
    - metering and mixing systems 333
    - overview 189
  - 2K epoxy adhesives 20
    - applications 192–193
    - chemistry and composition 190–191
    - curing/processing 191
    - overview 190
    - profiles 192–193
    - properties 192
  - 2K PU adhesives
    - curing/processing 195
    - overview 195
    - profiles 196
    - properties/applications 196
- U**
- UHU® 15
  - ultrasonic cleaning 110
  - unalloyed steel 4, 69, 101, 220
  - unplasticized PVC (U-PVC) 86
- V**
- valves, in adhesive metering 335
  - vapor degreasing 110
  - visco-elastic behavior 83
  - viscoelastic deformation 292, 293
  - viscous behavior 82
  - vortex spraying 339
- W**
- water-based (dispersion) adhesives 170
  - water-based wet (dispersion) adhesives 170
  - water resistance, testing 220
  - water-soluble substances 108
  - wedge test 270–272
  - wet bonding 43, 171, 253, 254
  - wet peel test 269
  - wet processing 171, 172, 174
  - wetting of surfaces 21–25
  - white glue 212
  - wood 66
    - adhesive systems 212
    - bonding materials 213
    - bonding requirements 211–212
    - formaldehyde resin dispersions 213
    - Hotmelt adhesives 212
    - moisture-curing 1K PU adhesives 213
    - post-curing PVA dispersions 213
    - properties of 95–96
    - PVA dispersions 212
    - surfaces 96
  - wood bonds 5
- Y**
- yield strength 68, 74, 267, 297–299, 301, 313, 314
  - Young's equation 21–23
  - Young's modulus 35, 68, 216, 308
- Z**
- zero-defect production 50
  - zinc deposition 71–72
  - Zismann method 24–25