

# Index

*Note:* Alphabetization is word-by-word.  
First page number is listed for each new entry.

- A. J. Lazarus Associates, Inc., 128  
AC effects, 21, 302, 316  
acknowledgments, xiii  
adherent fillers, 43  
agitators, design of, 239  
air-supported structures, 140, 142  
Alfrey Jr., Turner, 7, 16, 29, 34, 35  
allyl diglycol carbonate (ADC), 328  
American Society for Testing Materials  
(ASTM) standards, 18, 302, 303  
Anchor Plastics Co., 165  
anisotropic materials, 104  
annealing, 224  
ANSYS program, 90  
Applicon, Inc., 216  
Arnas Molded Plastics, 62  
Arrhenius relationship, 34  
arterial prostheses, 345, 347, 349  
artificial gills, 348  
artificial muscles, 352  
audio circuits, 312  
autoclave molding, 189
- Baer, Eric, 31, 34, 39, 41, 69, 313  
Bathe, K. -J., 90  
beams, 71  
bearings, 116  
Bell Helicopter Co., 103  
Benjamin, B. S., 30, 135, 136, 138, 141, 145  
Bennett, J. A., 206  
benzene ring, effect on plastics properties, 12  
Bernhard, J., 224  
biological systems, plastics in, 344  
bioplastics, 344  
bioscience, plastics in, 347  
birefringence, 25, 225, 327, 337  
Black, W. H., 194  
blow molding, 149, 168  
blow-molded parts, process interaction in, 232  
Blue Bird Body Co., 269  
Boltzmann superposition theory, 29, 34, 35, 37
- Boolean difference command, 215, 216  
borescopes, 333  
boron-epoxy plastics, 102  
bosses, design of, 158  
Botkin, M. E., 206  
bottle caps, 244, 246  
boundary representation techniques, 215  
brittle transition, 20  
Build program, 214  
bulk molding compound (BMC), 188  
butter test, 243
- CAD, 192, 233  
CAM, 192, 234  
carbon black, 43, 44  
carbon filament reinforced plastics, 140  
cast parts, process interaction in, 232  
casting processes, 149, 181  
catalytic fillers, 43  
cavitation, 121, 124  
chairs, 61, 264, 275  
charge carrier migration, 21  
*Chemical Engineers Handbook*, 288  
chemical agents, effect of, 229, 237, 239  
coaxial cables, 307, 309  
cold flow, 8  
collimation, 330  
Collins, Scott, v  
color, defined, 327  
color raster graphics, 198, 206, 210  
color-shaded images, 199, 202, 214  
compression molding, 149, 219  
computer flow charts, 83, 296  
computer programs, 84, 89, 202, 234, 297  
Computervision Corp., 198, 201, 202  
conoid shapes, 138  
constructive solid geometry, 215  
contact lenses, 328  
contact molding, 188  
Control Data Corporation, 90  
coordinate-measuring machines, 194, 217

- corrugated sheets, 131, 261  
 coupling agents, glass fiber, 56, 57  
 coupling currents, 306  
 crazing, 231  
 creep, 8, 33, 48, 64, 86, 92, 230, 264, 273  
 creep curves, 34, 62, 77  
 crossed polarizers, 339  
 crosslinked plastics, 10, 11  
 crystalline melting temperature, 19  
 crystalline solids, 3  
 crystalline transition, 19  
 crystallinity, 227, 234  
 cycle time optimization, 210  
 cyclical loading, 38, 92, 95  
 cystoscopes, 333
- Dacron arteries, 347, 349  
 Dainora, J., 90  
 damping designs, 100  
 DC effects, 21, 22, 302, 316  
 debugging of designs, 239  
 deflection time curves, 67  
 deformation fractures, 60  
 Dentique, 170  
 dentures, 346  
 design language programming, 196  
 design procedures, 251, 283  
 design steps, 192, 256  
 dichroic dyes, 353  
 dichroic polarizers, 338  
 dichroism, defined, 327  
 dielectric constants, 305, 308  
 dielectric loss factors, 307  
 Dietz, A. G. H., xiii  
 differential expansion, 227  
 diffraction gratings, 334  
 dimensional control, 229  
 dimensional tolerances, 154  
 dipole effect, 13, 21  
 directional sense arrows, 201, 205, 214  
 dispersion, defined, 327, 328  
 displaced geometry plot, 206, 207  
 domes, 135, 136, 137  
 Dow Chemical Co., 246  
 draft angles, 149, 194  
 drawn-down processes, 168, 174  
 du Pont de Nemours & Co., Inc., 109, 147, 323, 330, 332  
 DuBois and Pribble, book by, 154, 162  
 Dynamic Displays Co., 143  
 dynamic frequency, 40  
 dynamic load response, 90, 126, 281, 283
- edge-lighted signs, 330, 332  
 effect of AC/DC fields, 21, 22, 302, 316  
 egg-crate ribbing, 132  
*EI* product, 131, 268  
 electrets, 322  
 electrical applications, 302  
 electro-optic devices, 324  
 electroluminescent phosphors, 322, 342  
 electromagnetic bonding, 186, 187  
 electromagnetic radiation, 23
- electro-optics, 342  
 elliptic paraboloid shapes, 138  
 EMA Bond, Inc., 186  
 encapsulation, 182, 183  
 energy absorption, 23  
 energy crisis, 352  
*Engineering Design for Plastics*, 31, 34, 39, 41, 69, 87, 99, 313  
 environmental factors, 229, 237, 259, 284, 317  
 enzymic techniques, 354  
 erosion, 104, 119, 123  
 expansion bead molding, 149  
 extrusion molding, 149, 164
- family of parts, 196  
 fatigue, 41, 96, 284, 299, 316  
 fiber optics, 331, 342  
 fiber-reinforced plastics, 43, 44, 45, 56, 77, 146, 234  
 field effect, 14  
 figure of merit, 64  
 filament-winding, 140, 190  
 fill/flow analysis, 209, 234  
 fillers, 43, 44, 107  
 filtering gases, 348  
 filters, light, 341  
 finishes, glass fiber, 56, 57  
 finite element analysis (FEA), 89  
   computer programs for, 202, 204, 206  
 fish-eye lenses, 334  
 flake-filled laminates, 50, 52  
 fluid-borne particles, 121, 124  
 fluting, 158  
 flutter, 101  
 foamed dielectric material, 309  
 focal point, determination of, 328  
 food packaging, 349  
 food synthesis, 355  
 forging processes, 149, 180  
 Formica Corp., 61  
 Fresnel lenses, 334  
 friction, 104, 113  
 fringing, lens, 328  
 frozen-in stresses, 20, 223  
 furnace humidifiers, 244, 245
- gamma radiation, 354  
 gate, 150  
 gating designs, 152, 210  
 gears, 116  
 General Electric Co., 129, 207, 211, 243, 305, 342, 347  
 General Marble Co., 184  
 General Motors Research Laboratories, 206, 208  
 geodesic domes, 135  
 Glasflex Corp., 24  
 glass fibers, 46, 56  
 glass transition temperature, 20, 36, 94  
 glass-bonded mica, 312, 314  
 glassy materials, 2  
 Glide program, 214

- Han, C. D., 222  
 hand layup, 149, 188  
*Handbook of Plastic Optics*, 328  
 Hanratty, Patrick, 215  
 Harry Diamond Laboratories, 120, 121, 123  
 haze, 327, 330  
 heart valves, 344  
 heat distortion, 15, 212  
 heat transfer, 288  
 hedge cutter, 284, 292  
 heparin coating, 345  
 Hercules, Inc., 239  
 Herman Miller, Inc., 267  
 hermetically sealed containers, 321  
 high-risk applications, 250  
 honeycomb structures, 128, 133  
 Hooker Chemical Co., 77  
 Hooke's Law, 27  
 hoop stresses, 111, 112, 124  
 hot edge gating, 152  
 Hughes Connecting Devices, 255  
 Hull Corp., 182  
 hydrolysis, 240, 318  
 hydrophilic plastics, 328  
 hydrostatic loads, 104, 124  
 Hypalon elastomer, 143  
 hyperbolic paraboloid shapes, 139  
 hysteresis, 39, 41, 94, 99, 282, 295
- I-beams, 131  
 impact loading, 104, 106  
 impulse loading, 104, 107  
 injection molding, 149, 219  
 inserts, 163, 183  
 Instron testing machines, 110  
 International Filon Producers Assn., 78  
 introduction, ix  
 ion exchange resins, 351, 352  
 ionic solids, 3  
 isobar plot, 210, 211  
 iterative FEA techniques, 208  
 Izod impact tests, 104, 107
- Jacob, textbook by, 288, 290  
 jeep body, 146, 147  
 jetting, 226  
 jigglers pins, 161
- Katz, Harry S., xiii  
 keystroke functions, 195, 197  
 kidney machines, 345, 346, 347  
 kitchen environment, 237  
 knit lines, 226
- ladder polymers, 17, 19  
 Lamont, R. R., 222  
 lasers, 341, 342  
 Leaderman, curves by, 35  
 Lees, J. K., 126  
 Lennox Furnace Co., 245  
 lenticulations, 333
- Levy, Charlotte A., xiii  
 Levy, Lloyd E., 91, 292  
 light piping, 330, 331  
 light polarization, 327, 336, 341  
 light scattering, 327, 330  
 light transmissibility, 327, 330  
 lightning arrestors, 312, 314  
 limitations, 157  
 limited service, 249  
 linear polyethylene, 10  
 liquid crystals, 324, 340  
 load time diagrams, 63, 277, 287, 288  
 low density polyethylene, 10  
 low drag applications, 118  
 Lubin, George, 50, 126
- M.I.T., 260  
 MacAdams, textbook by, 288  
 McCormick, C. W., 91  
 McDonnell Douglas Automation Co., 197  
 macro programs, 195, 197  
 magnetic tapes, 322  
 manufacturing methods, 149  
 Marbon Division, Borg Warner Corp., 164  
 MARC-CDC program, 90  
 Mark, Herman F., xiii  
 Marvel, C. S., 17  
 mass properties, 201, 206  
 material interaction, 218  
 materials selection, 44, 51, 59, 63, 249, 354  
 Medical Engineering Corp., 348  
 Medronic Co., 346  
 Messerschmitt-Bolkow-Blohm GMBH, 146  
 metal migration, 319  
 Milewski, John V., 50, 126  
 milking machine parts, 247  
 mitral valves, 344  
 Mobay Chemical Co., 174  
 modeling techniques, CAD, 203  
 modelmaking, 194  
*Modern Plastics Encyclopedia*, 44, 61  
 modulus vs. strength, 13  
 mold fill analysis, 209  
 mold thermal analysis, 212  
 molds, 148  
 monitoring, 249  
 monomers, 7  
 Monsanto Co., 169  
 Mykroy Ceramics Co., 314  
 Mylar film, 113, 142, 314, 315, 322, 323
- NASTRAN program, 90  
 National Hydron Corp., 340  
 Newton's fluid flow law, 28  
 nonadherent fillers, 45  
 Northfield Corp., 128  
 nose cones, 122  
 numerical control (NC) tool paths, 193, 194, 216  
 nylon, 15, 16
- ophthalmic applications, 328  
 optical effects, 325, 326, 339

- Optical Sciences Group, 335  
orientation factors, 11, 106, 210, 222, 228, 231, 233  
Owens-Corning Fiberglas Corp., 57, 188
- pacemakers, 345, 351  
Padl program, 214  
paraboloid shapes, 138, 139  
parametric geometry, 196  
parison, 169  
parting lines, 148, 150, 152  
performance, 236, 284  
Peterson, F. E., 90  
photostress techniques, *frontispiece*, 25, 225  
physical properties, 1, 2  
piano keys, 242, 244  
plant costs, 172  
plaque testing, 233  
Plastec, 243  
plasticizers, 15, 43  
*Plastics Engineering Handbook*, 151, 159  
*Plastics Mold Engineering*, 154, 162  
plastics memory, 15, 228  
plate design, 71  
plenum chamber molding, 191  
plotter language, 192  
polarized light, 225, 327, 336, 341  
polarizing filters, 341  
polyamides, 15  
polyelectrolytes, 351, 352  
polyesters, 16, 17, 18  
polyethylene, types of, 10  
polyethylene terephthalate, 23  
polymer structure, 1  
polymeric materials, properties of, 4  
polystyrene, 14  
polyvinylchloride (PVC), 14, 15, 24, 106  
power connectors, 310  
pressure bag molding, 189  
printed circuits, 313  
process limitations, 148, 218  
processing interaction, 218  
product development cycle, CAD/CAM, 193  
prostheses, 345, 347  
pseudoplastic materials, 204  
pulse generators, 345  
pultrusion, 190  
puncture loading, 104, 110  
puncture stresses, 104
- quality control, 256  
quenched films, 20
- radiation, 23, 354  
radomes, 119, 120  
railroad tieplates, 100, 102  
rain erosion, 120  
reaction impingement molding (RIM), 149, 172  
recrystallization, 20  
reeding, 158, 220  
refraction, 329  
refractive index, 16, 327, 328
- reinforced vs. unreinforced, 51  
reinforcement, types of, 46  
repetitious part geometries, 195  
repositioning functions, 198  
Requicha, A. A. G., 215  
resistivity, 308, 319, 323  
responses, types of, 29  
retroreflecting lenses, 334  
reverse osmosis, 350  
Rexall-Fiberfil Co., 51  
ribs, designs for, 158  
risk level determination, 284  
Roark, formulas by, 79, 87, 124, 271, 276, 279  
Robinson Plastics Corp., 161  
Rohm & Haas Co., 137  
roof designs, 260, 270  
room temperature vulcanizing (RTV)  
    compounds, 185  
rotational molding, 149  
Rubbermaid Commercial Products, Inc., 195, 196, 207  
rubbery phases, 13  
runner design, 152, 210, 221
- sandwich panels, 86, 111, 127  
sandwich structures, 146, 252, 266  
sculptured surfaces, 216  
seating design, 61, 264, 275  
section properties, 200, 204  
shape effects, 168, 178  
shapes, 138  
shaping jigs, 168  
shear stresses, 37  
sheet molding compound (SMC), 188, 263, 274  
sheet thermoforming, 149, 174, 230  
shelf design, 59, 71, 251  
shift coefficients, 36  
Shock (Germany), 166  
shrinkage, 154, 233  
signal-carrying circuits, 23, 255  
silane reaction products, 56  
simulated service testing, 249  
sink marks, 157, 212  
sink tops, 184  
sliding shutoff molds, 160  
slush molding, 149  
S-N curves, 41, 96, 99, 299, 317  
snow loads, 262, 273  
Society of the Plastics Industry Inc., 154, 155, 156, 163  
solid modeling, 213  
Sonics & Materials, Inc., 185  
space erectable structures, 140, 142  
space vehicle applications, 348  
spray-up molding, 149, 189  
*Standard Practices of Plastics Custom Molders*, 154  
STARDYNE program, 90  
static loading, 126, 259, 283  
static mixers, 329  
stepped parting lines, 153  
steric hindrance, 12, 13

- stick figure forms, 199
- stiffening, 126, 179, 220
- strain gages, 246
- stress analysis, 25, 59
- stress-based diffusion, 34
- stress cracking, 231
- stress relaxation, 8
- stress risers, 45, 46
- stress-strain relationships, 27, 30, 31, 40, 45, 69, 93
- structural foams, 149, 165
- structural member design, 71
- structural moldings, 166
- superminicomputers, 214
- surface capabilities, CAD, 199
- surface models, CAD, 199, 201
- surface resistivities, 313
- surface treatments, 180
- surgical implants, 345
- Swanson Analysis Systems, Inc., 90
- synclastic tension membranes, 138
  
- T-beam construction, 131
- taper angles, 149, 151
- Tech Art Plastics Co., 60, 242
- temperature rise optimization, 212
- tensile creep, 64
- tensile impact, 46, 106
- tension structures, 138, 147
- Terek, Greg, P., v, 192
- test methods, 104
- testing machines, 110
- thermal properties, 49
- thermal stresses, 87
- thermoforming, 4, 5, 6, 7, 149, 172, 174
- thermoplastics, 10, 16
- thermosets, 11, 16
- 3-D data base, 192, 217
- Tips program, 214
- tracheal intubation parts, 348
- transfer molding, 149, 219
- transformer cores, 322
- transparent plastics, 24, 325, 330
- TV antenna cables, 309
  
- U.S. Precision Lens, Inc., 326, 328
- UHF-TV cables, 309
  
- ultimate strength, 30
- ultra-high molecular-weight (UHMW) plastics, 10, 118
- ultrasonic bonding, 133, 185, 187
- ultraviolet (UV) light, 25, 245
- undercuts, 148, 150, 161
- uniaxial tension creep, 31
- Uniroyal Co., 130
- unmolding, 15, 225
  
- vacuum bag molding, 188
- vacuum forming, 149, 172, 174, 230
- vacuum-formed parts, 232
- Van der Waals attraction, 9, 34
- venting, 150, 227
- verification, 194, 198, 217
- viscoelastic behavior, 4, 8, 28, 34
- viscoelastic deformation, 88
- viscoelastic materials, 38, 99
- Vishay Measurements Group, *frontispiece*
- vitrified amorphous ceramic, 3
- Voelcker, J. B., 215
  
- wall thickness considerations, 157, 221
- Ward, I. M., 40
- water, effect of, 229, 237, 239, 317
- wave of the future, 213
- weathering, 119, 247, 259, 263, 274
- weld lines, 226
- Wesolowski, S. A., 349
- Westinghouse Co., 101, 315
- William-Landel-Ferry (WLF) relationship, 36, 68, 69, 70, 77, 289
- Wilson, E. L., 90
- wind erosion, 119
- wing sections, 137, 139
- wireframe representation, 194, 199
- work hardening, 5
  
- X-ray equipment, 316
  
- yield strength, 30
- yield stress vs. deformation, 12
- Young's modulus, 30
  
- Zero Manufacturing Co., 247