

# INDEX

## A

- Abraders, 305–306, 309
- Abradometer, for traffic paint studies, 472
- Abraser, 308–309
  - for mar test, 298
- Abrasiometer, 304–305
- Abrasion, 302
  - block for, 311
  - impinging, for mar resistance test, 297–298
  - resistance to, 301–312
    - blast methods for tests of, 304–307
    - and hardness, 301
    - loose or falling abrasive tests of, 302–304
    - and mar resistance, 301
    - and modulus of elasticity and tensile strength, 301
    - and rain or water erosion, 310
    - rectilinear motion for tests of, 309–310
    - rotating disks for tests of, 307–308
    - rotating wheels for tests of, 308–309
    - and service performance, 301–302
    - of tile-like coatings, 460
    - of traffic paint, 312, 472–473
    - wet abrasion methods for tests of, 310–311
  - testing machine, 307–308
- Abrasive matter, in polishes, 440
- Absorption
  - of architectural paint, 425–426
  - of oil (*see* Oils, absorption of)
- Acetone tolerance, of oils, 65
- Acid(s)
  - absorption by solvents, 143–144
  - in alkyd resins, 95–97
  - dye laking, for pigments, 156
  - resistance to, in glass beads, 469
- Acid value
  - of alkyd resins, 102
  - of oils, 55–56
  - of printing ink, 491
  - of resins, 84
  - of tall oil, 87
  - of varnish, 419
  - of waxes, 438
- Acidity
  - of pigments, 500
  - of plasticizers, 124
  - of solvents, 146–147
- Acrylics
  - resin, 114–115
  - solubility parameters of, 132
- Acrylonitrile resins, 108–109
- Actinic values, in artificial weathering, 410
- Activity test, for cleanliness of steel panels, 379–380
- Adherometer, 317–318
- Adherometer-Integrometer, 318
- Adhesion, 314–331
  - adhesive joint tests of, 323–326
  - or architectural paint, 426–427
  - classification of test methods for, 315
  - and edge adhesion, test, 318–319
  - hydrophil balance test of, 330–331
  - impact and bending tests of, 330
  - inertia tests of, 329–330
  - interfacial forces of, 314–315
  - knife removal test of, 315–319
  - lap shear tests of, 325–326
  - metal-glide adhesion test of polishes, 441–442
  - peel tests of, 326–329
  - scraping and scratching tests of, 319–323
  - of sealants, 449–452
  - of seamless floors, 461
  - tension tests of, 323–324, 325
  - of tile-like coatings, 456–457
  - torque shear tests of, 326
- Adhesive tape tests, of adhesion, 327
- Adhesiveness
  - shearing, of putty, 447
  - tensile, of putty, 449
- Adulteration
  - and dirt content (*see* Dirt)
  - of lac, 88–89
  - of oils, tests for, 66–68
  - of solvents, 145–147
  - of traffic paint, 474–477
- Aerosol propellants, chromatography of, 539
- Aging tests, for caulks and sealants, 453–454
- Air pollution, 413–414
- Air pressure tests, for adhesion, 329
- Alcohols, in alkyd resins, 98
- Alizarine red, 159
- Alkali
  - increase test on varnishes, 419
  - resistance to, 352
    - in coating for concrete, 431
    - in the tile-like coatings, 456–457
- Alkalinity
  - of pigments, 500
  - of solvents, 146–147
- Alkyd resins, 92–103
- Alligatoring, 399
- Alumina
  - hydrate, as extender, 160
  - in magnesium silicate pigment, 503
  - in titanium pigments, 500
  - in white pigments, 500
- Aluminate pigments, 156
- Aluminized bituminous coating, 465
- Aluminum
  - oxide, in aluminum silicate pigment, 503
  - panels of, for weathering tests, 382–383
  - pigments, 161
    - leafing test of, 417–418
  - silicate pigment, chemical analysis of, 503
  - as substrate for free films, 259
- American National Standards Institute, 585
- Amines
  - resin, 109
  - solubility parameters of, 132
  - spontaneous combustion of, 365
- Analysis of whole paint, 495–514
  - binder identification in, 498–499
  - and chemical analysis of pigments, 500–514
  - flash point in, 498
  - nonvolatile content of, 496–497
  - pigment content of, 497
  - pigment separation in, 498
  - preliminary tests in, 496–498
  - sampling for, 495–496
  - solvent identification in, 499
  - solvent separation in, 499
  - vehicle separation in, 498
  - water content of, 497–498
- Analyzers
  - for drying time, 277
  - for particle size measurements, 223, 224, 227, 229–230
- Angle of contact, 216
  - in test for cleanliness of steel panels, 379
- Angular-dependence techniques, for particle size measurement, 226
- Angular scribe-stripping, for adhesion test, 322
- Aniline point of solvents, 132–133
- Aniline test, for urea-formaldehyde in nitrogen resins, 107
- Anthrapyrimidine yellow, 159
- Anthrathrone orange, 159
- Antifouling paints, 479–481
  - cuprous oxide in, 510
  - electron microscopy of, 481
  - leaching rate of, 481
  - metallic copper in, 480–481, 506, 510
- Antimicrobial agents in paints, 367
- Antimony oxide pigments, chemical analysis of, 502–503
- Antimony trioxide pigments, 151
- Appearance
  - of architectural paint film, 426
  - of clear floor sealers, 421
  - of driers, 71
  - of seamless floors, 461
  - of varnish, liquid, 415
  - and weathering, 384
- Architectural paint, 423–428
  - absorption and holdout of, 425–426
  - adhesion of, 426–427
  - appearance of, 426
  - blister resistance of, 427
  - coarse particles in, 423
  - color acceptance of, 426
  - condition in container, 423
  - density of, 423
  - dilution stability of, 423–424
  - dry film tests of, 426–428
  - drying time of, 426
  - efflorescence of, 427
  - elongation of, 427
  - exterior, 423
  - fading of, 428
  - flash point of, 423
  - freeze-thaw stability of, 426
  - fume resistance of, 427
  - interior, 423
  - liquid, 423–426
  - resistance to fungi, 427
  - resistance to microorganisms, 426
  - scrub resistance of, 428
  - skinning of, 423

- stain resistance of, 428
  - viscosity of, 424
  - washability of, 427–428
  - working properties of, 424
  - yellowness index of, 428
  - Arnold test, for settling of pigments, 170
  - Artists colors
    - hardness of, 291
    - standards for, 49–50
  - Asbestos, in bituminous coatings, 465
  - Ash
    - in bituminous emulsions, 466
    - in lac, 90
    - in mercuric oxide pigment, 511
    - in oils, 61
    - in pigments, 500
    - in polishes, 439
    - ratio to binder, in electrocoating paints, 487
    - in resins, 84
    - in rosin, 85
    - in tall oil, 87
  - Asphalt, 462
    - in bituminous coatings, 465
    - see also* Bituminous coatings
  - Asphalt trimmer, use of, 256
  - Atomic absorption, and flame spectroscopy, 550–552
  - Azo pigments, 156–158
- B**
- Balanced beam tester
    - of adhesion, 320
    - of mar resistance, 296
  - Band viscometers, 197
  - Barium metaborate, as extender, 160
  - Barium sulfate
    - chemical analysis of pigment, 504
    - in chrome green pigment, 509
    - in zinc sulfide pigments, 502
  - Bayberry wax, properties of, 437
  - Beam testers
    - balanced
      - for adhesion, 320
      - for mar resistance, 296
      - swinging, for hardness, 285
  - Beeswax, properties of, 437
  - Bell jar test, of varnish films, 419
  - Belt buckle test, for mar resistance, 298
  - Bend tests
    - for adhesion, 330
    - for glazing compound flexibility, 449
    - for sealant adhesion, 451
  - Benzoguanamine-formaldehyde
    - in alkyd resins, 99, 100
    - in nitrogen resins, 106–107
  - Benzoic acid, in alkyd resins, 95–96
  - Binders
    - equal free, 164
    - and oil absorption, 242–243
    - fixed, 164
    - identification of, 498–499
    - ratio to ash, in electrocoating paints, 487
  - Bingham bodies, 182
  - Biological deterioration of paint, 366–370
  - Bituminous coatings, 462–467
    - aluminized, 465
      - reflectance of, 466
    - application of, 466
    - asphalt in, 465
    - blistering and sagging of, 466
    - contact compatibility test of, 464
    - distillation of, 465
    - ductility of, 463
    - emulsions of, 466–467
    - filler content of, 465
    - flash point of, 464
    - flexibility of, 466
    - nonvolatile content of, 464
    - penetration of, 463
    - and settling test for roof coatings, 465–466
    - softening point of, 463
    - solid and semisolid, 463–464
    - solubility of, in carbon disulfide, 462
    - solvent-thinned cut-back, 464–466
    - spot test of, 462–463
    - uniformity of, 464
    - viscosity of, 464
    - water content of, 465
  - Black pigments, 159–160
    - bone, 160
    - carbon, 160
    - chemical analysis of, 505–506
    - iron oxide, 160
    - mineral, 160
  - Blasting cleaning, of steel panels, 381–382
  - Blast tests, abrasive, 304–307
  - Bleach, heat, of oils, 65
  - Bleed test, overstripe, of pigments, 163
  - Bleeding
    - of printing ink, 491
    - tests for, 163–164
    - of traffic paint, resistance to, 473
  - Blister boxes, tests with, 346–347
  - Blister formation, 341, 391–392, 398
    - in architectural paint, 427
    - in bituminous coatings, 466
  - Blister houses, use of, 348
  - Blister tests, for adhesion, 329
  - Blue
    - chemical analysis of pigments, 506–508
    - cobalt, 156
    - copper phthalocyanine, 158
    - indanthrone, 159
    - iron, 155
    - ultramarine, 156, 508
  - Boiling point, of solvents, 139–140
  - Bond strength, of sealants, 449–451
  - Bone black pigment, 160
    - chemical analysis of, 505–506
  - Borates, as extenders, 160
  - Box tests, for fire retardance, 355
  - Break, in oils, 62
  - Bromine number, of solvents, 143–144
  - Bronze pigments, 161–162
  - Brown pigments, chemical analysis of, 509–510
  - Brushability of paint, 202–206, 424
  - Brushometer, 191, 205
  - Bubble pressure method, for surface tension measurements, 215
  - Bubble viscometers, 197–198
  - Bulking values, 172–176
    - of oils, 174
    - of pigments, 172–174
    - of plasticizers, 176
    - of resins, 81, 174
    - of solvents, 175
  - Bullet method adhesion test, 330
- C**
- Cabinet test, for fire retardance, 355–356
  - Cacahuananche oil, 53
  - Cadmium colors, 155
  - Calcium
    - carbonate
      - chemical analysis of pigment, 503
      - as extender, 160
      - in Venetian red, 510
  - chloride, glass bead resistance to, 469
  - in driers, determination of, 73, 74
  - oxide
    - in calcium carbonate pigment, 503
    - in chrome green pigment, 509
    - in magnesium silicate pigment, 503
    - in zinc powder, 506
  - sulfate pigment, chemical analysis of 503–504
  - Candelilla wax, properties of, 437
  - Candlenut oil, 53
  - Capillary rise method, for surface tension measurements, 214–215
  - Capillary viscometers, 182
  - Carbazole dioxazine violet, 159
  - Carboloy drill, for film thickness measurement, 262
  - Carbon arc Weather-Ometer, 406
  - Carbon blacks, 160
    - chemical analysis of, 505–506
  - Carbon dioxide
    - in carbonate white lead, 501
    - in red lead, 511
  - Carbonate white lead, basic, 150
    - chemical analysis of, 501
  - Carbonates, as extenders, 160
  - Carboxylic acids, in resins, 93–97
  - Carboxymethylcellulose, sodium, 122
  - Carnauba wax, 437
    - paraffin hydrocarbons in, 438
  - Caster, film, for latex, 253
  - Casting knife, film, adjustable, 252
  - Castor oil, 53
    - hydroxyl value of, 64
  - Cathodic protection, of marine paints, 481–482, 483–484
  - Caulking compounds, 445–454
    - aging tests on, 453–454
    - extrudability of, 446–447
    - rheological properties of, 446, 447–448
    - shrinkage of, 448–449
    - stain tests of, 454
    - tenacity of, 449
    - working properties of, 445–447
    - see also* Sealants
  - Cellulose acetate, 120–121
    - butyrate, 121
    - color and haze of, 120
    - propionate, 121
    - viscosity of, 120
  - Cellulose nitrate, 119–120
    - in alkyd resins, 101
    - base solutions of, 120
      - viscosity of, 196
    - determinations of, 104–106
    - drying of, 119
    - film test of, 120
    - solubility of, 120
    - toluene dilution ratio of, 120
    - viscosity of, 119–120
  - Cellulosics, 119–123
    - cellulose acetate, 120–121
    - cellulose nitrate, 119–120
    - ethylcellulose, 121
    - hydroxyethylcellulose, 122
    - hydroxypropyl methylcellulose, 122–123
    - methylcellulose, 121–122
    - resins, 103–106
    - sodium carboxymethylcellulose, 122
    - and solubility parameters, 132
    - and viscosity, 195–196
  - Cement-base paint, 429–435
    - alkali resistance of, 431
    - coarse particles in, 429
    - color of, 429

- efflorescence resistance of, 432–433
- and oil absorption, 430
- performance tests of, 431–435
- plaster cup test of, 432
- properties of, 429
- and ready-for-paint stage of masonry, 434–435
- set time of, 430
- tests on dry powder, 429–430
- waterproofing with, 433–434
- wet feet test for, 431
- Centrifuge methods
  - for particle size measurement, 223–224
  - for specific gravity, 168
- Ceresine wax, properties of, 437
- Chalk/fade test, 386–387
- Chalk standards, 385
- Chalking, 384–387
  - Mitton-Church treatment of data on, 387
  - of sealants, 453
  - testers for, 385–386
- Checks, in film, 387–388
- Chelometric determination, of drier metals, 73–74
- Chemical analysis of pigments, 500–514
  - antimony oxide, 502–503
  - black pigments, 505–506
  - blue pigments, 506–508
  - brown pigments, 509–510
  - carbonate white lead pigments, 501
  - and color identification charts, 511–514
  - extender pigments, 503–505
  - green pigments, 508–509
  - metallic pigments, 506
  - moisture content, 500
  - orange pigments, 508–510
  - reagent water for, 500
  - red pigments, 509–514
  - silicate white lead, 501
  - sulfate white lead, 501
  - titanium pigments, 500–501
  - tribasic lead phosphosilicate, 501–502
  - white pigments, 500–503
    - mixed, extracted from paint, 504–505
  - yellow pigments, 508–510
  - zinc oxide, 502
  - zinc sulfide, 502
- Chemical properties of films, 341–370
  - biological deterioration, 366–370
  - chemical resistance, 351–354
  - fire retardance and heat resistance, 355–365
  - water vapor resistance, 341–350
- Chemical resistance, 351–354
  - of glass beads, 469
  - immersion tests of, 351–353
  - to perspiration, 353, 421
  - of printing ink, 491
  - salt fog test of, 353–354
  - of seamless floors, 461
  - spot tests of, 351
  - of tile-like coatings, 459
- Chia oil, 53
- Chill, sudden, effects of, 411
- Chipping, of traffic paint, 473, 476
- Chisel tests of adhesion, 315, 316, 318, 319
- Chlorendic acid, in alkyd resins, 96–97
- Chlorides
  - in copper pigments, 510
  - in plasticizers, 126
  - in strontium chromate pigment, 509
- Chlorine, in zinc powder, 506
- Chloroform-insoluble matter, in oils, 64
- Chloro-isindolinone pigment, 159
- Chromate pigments, 154–155
- Chromate treatment, of galvanized steel, 382
- Chromatography, 522–542
  - for acrylic resins, 114
  - adsorption, 523
  - for carboxylic acids in alkyd resins, 93
  - displacement analysis, 522–523
  - of drying oils, 69–70
  - elution analysis, 523
  - frontal analysis, 522
  - gas, 530–542
    - for binder identification, 498
    - glossary of, 540–542
  - gas-liquid, 530–539
    - of aerosol propellants, 539
    - interpretation of, 534–535
    - of oils, 537–538
    - of plasticizers, 539
    - pyrolytic, 538–539
    - of resins, 538–539
    - of solvents, 535–537
    - technique, 530–534
  - gas-solid, 539–540
  - gel permeation, 526–527
  - liquid, 523–530
    - classical column, 524–525
    - high efficiency, 525–526
  - paper, 527–528
  - partition, 523
  - for phthalic anhydride in alkyd resins, 95
  - of plasticizers, 127–128, 539
  - of solvents, 141–143, 535–537
  - thin-layer, 528–530
  - of traffic paint, 475
- Chrome greens, 155
  - chemical analysis of, 508–509
- Chrome orange, chemical analysis of, 508
- Chrome yellow, chemical analysis of, 508
- Chromium
  - oxide green, 156
    - chemical analysis of, 509
  - in strontium chromate pigment, 509
  - in zinc yellow pigment, 509
- Clarity, of oils, 63
- Cleanliness of steel panels, drop test of, 379
- Cleavage tests, for adhesion, 326
- Climate, effects of, 371
- Climate test artificial weathering machine, 409
- Coarse particles (*see* Particles, coarse)
- Coaters for film preparation
  - dip, 256
  - rapid, 253
- Cobalt
  - in copper pigments, 510
  - in driers, determination of, 72–73, 74
- Cobalt blue, 156
- Coefficient-of-friction mar test, 299
- Cohesiveness, of putty and caulking compounds, 449
- Coin mar test, 299
- Cold check test, of varnish dry film, 421
- Cold crack test, of flexibility, 336
- Color, 1–12
  - acceptance test, for architectural paint, 426
  - atlas of, 8
  - of cellulose acetate, 120
  - of cement-base paint, 429
  - of chromate pigments, 155
  - comparator, 9
  - defective observation of, 5
  - dictionary of, 8
  - of driers, 71
  - identification charts, 511–514
  - instrumental measurement of, 10–12
  - of lac, 90
  - mass, 41–50
    - basic factors in, 41
  - and color matching, 48–49
  - instruments for evaluation of, 46–47
  - and mixing of pigment and vehicle, 41–43
  - visual rating of, 43
  - of white pigments, 43, 46
  - matching of
    - booth for, 2
    - instrumental, 37, 48–49
  - metameric, 2–3
  - mixing of, 6–7
  - Munsell system, 7
  - of oils, 63
    - test for, 69
  - order systems for, 7–8
  - specialized, 8–10
  - Ostwald system, 7–8
  - of plasticizers, 124
  - Plocher system, 8
  - of printing ink, 491
  - strength of, 492–493
  - psychological factors in, 4
  - reactions in drying oils, 69
  - of resins, 76
  - retention of, 391
    - in tile-like coatings, 459
  - or rosin, 85
  - scale for, 10
  - of shellac varnish, 421
  - of solvents, 145
  - standards for, 9
  - temperature of, 1–2
  - of varnish, liquid, 415
- Colored pigments, 151–159
  - hiding power of, 22, 27
  - organic, 22, 156–159
  - tinting strength of, 43–44
- Colorimetric methods
  - for cellulose nitrate, 105
  - for phthalic anhydride in alkyd resins, 95
  - tristimulus, 12
  - subtractive, 6
- Comb tests, for leveling, 209
- Combustion, spontaneous, 364–365
- Comparator
  - color, 9
  - flow, 209–210
  - surface profile, 266
- Condensation, resistance to, 343–346
- Conductivity cell, for chemical resistance, 352–353
- Cone and plate viscometer, 194
- Congearing point, of waxes, 436
- Consistency cone, 185
- Consistency index, 208
  - see also* Viscosity
- Consistometer, 200
- Contact angle, 216–217
  - in test for cleanliness of steel panels, 379
- Contact area, interfacial, and adhesion, 314–315
- Contact compatibility test, of bituminous coatings, 464
- Contamination (*see* Adulteration)
- Contrast ratio, and hiding power, 22, 26
- Copal in lac, detection of, 88
- Copper
  - corrosion of plasticizers, 124
  - metallic, in antifouling paints, 480–481, 506, 510
  - phthalocyanines, 158
    - chemical analysis of, 507
  - pigments, 162
    - chemical analysis of, 510
- Cork twisting, for indentation hardness, 294
- Corn oil, 53

Corner-wall test, of fire retardance, 359  
 Corrosion  
   copper corrosion of plasticizers, 124  
   inhibitive value of pigments, 164  
   thin substrates corrosion test, 411  
 Cottonseed oil, 53  
 Coulometry, constant-current, 560–561  
 Cracks, 387–388  
   in sealants, 453  
 Crib test, of fire retardancy, 357  
 Critical pigment volume, 243–247  
   and oil absorption, 246–247  
 Crockmeter, use of, 441  
 Crosscut adhesion test, 319–320  
 Crosshatch tape tests, of adhesion, 328  
 Crowfoot patterns, 388  
 Cryptometers, 23–25  
   assessment of, 25  
   black and white, 24  
   precision, 24  
   rotary, 24  
 Crystallinity of petroleum waxes, 438  
 Cup(s)  
   flow, pressurized, 183  
   plaster, for test of cement-base paint, 432  
   viscosity, 184, 185, 186  
 Cupping tests, of flexibility, 335  
 Cuprous oxide, 156  
   in antifouling paint, 510  
 Curds, in architectural paint, 423  
 Cypress shingle test, for fire retardance, 355

## D

DDT-treated paints, 370  
 Degreasing of metals, for weathering tests, 378  
 Density, 165–171  
   apparent, 169–170  
   of architectural paint, 423  
   end point method, for oil absorption test, 241  
   of plasticizers, and refractive index, 127  
   of solvents, 145  
   of varnish, liquid, 417  
 Detergents, resistance to, 352  
 Dew detectors, 392, 408  
 Diarylide yellows, 157  
 Diatomaceous silica pigments, chemical analysis of, 503  
 Diene value of oils, 61  
 Dilatant flow, 181  
 Dilution  
   limit of solvents, 135  
   ratio of solvents, 135  
   stability of architectural paint, 423–424  
 Dimers, in bodied oil, 68  
 Dioxazine pigments, 159  
 Dip coater, for film preparation, 256  
 Dipotassium salt method, for phthalic anhydride in alkyd resins, 93–94  
 Dipping, for preparation of films, 256  
 Dirt  
   in resins, 81–84  
   retention of paints, 389  
   in rosin, 85  
 Dispersion  
   fineness of  
     in architectural paint, 423  
     gages for, 233–235  
     in printing ink, 492  
   and oil absorption of pigments, 249–250  
   optical, of tung oil, 62–63  
   time for, in oil colors, 43  
 Displacement method  
   for contact angle determination, 216–217  
   for specific gravity, 170

Distillation  
   of bituminous coatings, 465  
   of plasticizers, 124  
   temperature for, and evaporation of solvents, 138  
 Doctor blades, for preparation of films, 251–256  
   adjustable, 252, 253  
   automatic, 254–255  
   magnetic chuck with, 255  
   motor drive for, 255  
 Donath test, for rosin identification, 77  
 Dowel test, for adhesion of tile-like coatings, 457  
 Draft test of varnish films, 420  
 Drawdown method  
   for leveling studies, 209  
   thin-film, for particle size measurement, 232  
 Driers, 71–75  
   appearance of, 71  
   calcium in, 73, 74  
   chelometric determination of metals in, 73–74  
   chemical analysis of, 72–73  
   cobalt in, 72–73, 74  
   color of, 71  
   drying power of, 71  
   flash point of, 72  
   iron in, 73  
   lead in, 72, 73, 74  
   manganese in, 72, 73, 74  
   metals in, determination of, 72–74  
   miscibility of, 71  
   nonvolatile matter in, 72  
   physical tests on, 71–72  
   specific gravity of, 72  
   stability of, 72  
   viscosity of, 72  
   zinc in, 73, 74  
 Drip point, of resins, 81  
 Drop test, for cleanliness of steel panels, 379  
 Drop-weight method, for surface tension measurements, 215–216  
 Dry film thickness, 261–265  
 Drying oils, 53–70  
   acetone tolerance of, 65  
   acid value of, 55–56  
     in dark oils, 56  
   adulteration of, tests for, 66–68  
   ash in, 61  
   blown, oxygen content of, 65–66  
   boiled linseed oil, detection of, 68  
   break in, 62  
   Brinker color test for, 69  
   chloroform-insoluble matter in, 64  
   chromatography of, 69–70  
   clarity of, 63  
   color of, 63  
   diene value of, 61  
   dimers and trimers in, 68  
   drying properties of, 66  
   fish oils in, detection of, 68–69  
   flash point of, 63  
   foots in, 61–62  
   gelation tests of, 66–67  
   heat bleach of, 65  
   heat bodying rate of, 64–65  
   hexabromide yields of, 58–59  
   hydroxyl value of, 64  
   iodine value of, 57–58  
   loss on heating of, 63–64  
   moisture in, 64  
   oxygen content of, 65–66  
   reagents for chemical tests of, 55  
   refractive index of, 62–63  
   sampling of, 55

saponification value of, 56–57  
   specific gravity of, 62  
   spontaneous combustion of, 364–365  
   thiocyanate value of, 60–61  
   types of, 53–55  
   unsaponifiable matter in, 57  
   unsaturation in, 57–61  
   viscosity of, 63  
 Drying properties  
   of printing ink, 491  
 Drying time, 268–279  
   of architectural paint, 426  
   circular recorder for, 274–275  
   Dry-O-Graph for, 274  
   dry-to-recoat, 273  
   dry-through or dry-to-handle, 273  
   dry-to-touch, 272  
   dust-free, 269–270  
   environment affecting, 268–269  
   final, 272–273  
   hard-drying, 273  
   hardness rocker for testing of, 277–278  
   meters for, 273–274  
   paraffin companies machine for, 274  
   recorders for, 274–277  
   rolling ball testers for, 277  
   set-to-touch, 269  
   of shellac varnish, 421  
   tack-free, 270–272  
   and touch controller, 273  
   universal recorder for, 276–277  
   for varnishes, 419, 421  
 Dry-O-Graph, use of, 274  
 Ductility, of bituminous coatings, 463  
 Durometer hardness, of sealants, 452  
 Dust-free drying time, 269–270  
 Dynamometer, scratch, 283

## E

Eddy-current gage, for film thickness measurement, 265  
 Edge adhesion test, 318–319  
 EDTA method  
   for cellulose nitrate in alkyd resins, 101  
   for determination of drier metals, 73–74  
 Efflorescence  
   of latex paint, 427  
   resistance to, in masonry paints, 432–433  
 Efflux type viscometers, 183–186  
 Ehrlich's reagent, for urea-formaldehyde in nitrogen resins, 107  
 Elasticity  
   and abrasion resistance, 301  
   of varnish, liquid, 417  
 Elcometer  
   for film thickness measurement, 265  
   for surface profile measurement, 266  
   for testing adhesion of tile-like coatings, 457  
 Electrical properties, of plasticizers, 124  
 Electrocoating paints, 486–489  
   ash-binder ratio in, 487  
   and current requirements, 488  
   feed materials for, 488  
   laboratory apparatus for, 488–489  
   nonvolatile content of, 486  
   pH of, 486  
   pumping stability of, 487–488  
   test panels for, 486, 487  
   throwing power of, 487  
 Electroendosmosis, in electrocoating, 486  
 Electrolysis, in electrocoating, 486  
 Electron microscopy (*see* Microscopy)

- Electronic analyzer, for particle size measurement, 229–230
- Electrophoresis, in electrocoating, 486
- Electro-viscometer, 192
- Elongation  
  of architectural paint, 427  
  and tensile strength, 338–340
- Elutriation, for particle size measurement, 227–228
- Embrittlement test, photochemical, 410
- Emulsion-type waxes, 439–440
- Emulsions, bituminous, 466–467
- End-use tests, of pigments, 163–164
- Energetics, surface, 213–217
- Environment  
  affecting drying time, 268–269  
  affecting flexibility, 333  
  and effects of climate, 371  
  pollutants in, 413–414  
  temperature of (*see* Temperature)  
  and water vapor and liquid in atmosphere, 341–350  
  *see also* Weathering
- Epoxy resins, 111–112  
  solubility parameters of, 132
- Equal free binder, 164  
  and oil absorption, 242–243
- Equations  
  Fell, for hiding power, 27  
  Hallett, 37  
  Kubelka-Munk (*see* Kubelka-Munk equations)
- Erosion resistance, of traffic paint, 473
- Esters  
  cellulose, determination of, 104  
  value of plasticizers, 124
- Ethers, cellulose, determination of, 104
- Ethylcellulose, 121
- Evaporation rate, of solvents, 135–141  
  index for, 138–139
- Exposure (*see* Weathering)
- Extenders, 160–161  
  in blue pigments, 507  
  chemical analysis of, 503–505  
  dispersant demand of, 250  
  particle size of, 218
- Extrudability, of caulking compounds, 446–447
- F**
- Fading, of architectural paint, 428
- Falling ball viscometers, 194–197
- Fatty acids  
  in alkyd resins, 97  
  in tall oil, 88  
  in tall oil rosin, 86
- Federal color standard, 8
- Federal specifications, pigment standards for, 49
- Federal test, for dry opacity, 31
- Feigl's reagent, for urea-formaldehyde in nitrogen resins, 107
- Fell equation, for hiding power, 27
- Felvation, for particle size measurement, 227–228
- Ferric oxide, in barium sulfate pigment, 504
- Ferrocyanides, 155
- Filler content, in bituminous coatings, 465
- Film(s), 251–279  
  acid value of, 56  
  caster of, for latex, 253  
  casting knife for, adjustable, 252  
  for cellulose nitrate test, 120  
  chemical properties of, 341–370  
  drying time of, 268–279  
  hardness of, 281–299  
  mechanical properties of, 281–340  
  preparation of, 251–259  
    applicators for, 252, 253, 254  
    by dipping, 256  
    with doctor blade, 251–256  
    by flowing, 256  
    for free films, 257–259  
    hot rolling method for, 256  
    hydraulic press method for, 257  
    by spinning, 257  
    with spray, 251  
  solubility parameters in formers of, 130–131, 132  
  thickness of, 260–267  
    dry film, 261–265  
    and pigment volume concentration, 244  
    profile measurement of, 265–267  
    and reflectance, 25–26  
    wet film, 260–261  
  volume of, and pigment volume concentration, 245  
  wedge-shape films, 255
- Film-O-Graph, 252–253
- Fineness-of-dispersion (*see* Dispersion, fineness of)
- Finger fineness test, of pigments, 163
- Fingernail test  
  for indentation hardness, 288  
  for mar resistance, 299
- Fire retardance, 355–365  
  box tests for, 355  
  cabinet test for, 355–356  
  corner-wall test of, 359  
  crib test of, 357  
  cypress shingle test of, 355  
  radiant panel test of, 359  
  roof corner test of, 357–358  
  Schlyter test of, 359  
  Schulz tester for, 355  
  sidewall test of, 358–359  
  and spontaneous combustion, 364–365  
  SS-A-118 test of, 359  
  stick and wick test of, 356–357  
  tunnel tests of, 360–361  
  vertical match test of, 357
- Fischer method, for moisture in oils, 64
- Fish oils, 53  
  detection of, 68–69
- Fixed binder, 164
- Flaking, 388
- Flamability, of bituminous emulsions, 467
- Flame emission spectroscopy, 550–552
- Flame test, of bituminous emulsions, 467
- Flash point  
  analysis of, 498  
  of architectural paint, 423  
  of bituminous coatings, 464  
  of driers, 72  
  of oils, 63  
  of plasticizers, 125  
  of solvents, 140–141  
  of varnish, liquid, 417
- Flexibility, 333–337  
  of bituminous coatings, 466  
  of bituminous emulsions, 467  
  determination of, 333–337  
  factors affecting, 333  
  of glazing compound, 449  
  of sealants, 449, 451  
  of traffic paint, 470
- Floor polishes (*see* Polishes)
- Floor sealers, clear, tests on, 421
- Floors, seamless, 460–461
- Flotation method, for specific gravity, 170
- Flow  
  comparator, 209–210  
  cups, pressurized, 183  
  definition of, 181  
  dilatant, 181  
  gage, 201  
  plastic, 181  
  point, 249  
  pseudoplastic, 181
- Flowing  
  for preparation of films, 256  
  properties of printing ink, 491
- Flowmeters, 200–202
- Flowplate, 201
- Fluidmeter, 201
- Fluorescence, 3  
  of pigments, 162  
  of plasticizers, 127
- Fluorescent sunlamps, 409
- Fog testing, 343, 344
- Foots, in oil, 61–62
- Forming tests, for flexibility, 335
- Formula for paint, yield of, 171, 176
- Free binder, 164  
  and oil absorption, 242–243
- Freeze-thaw stability, of architectural paint, 426
- Friction  
  coefficient of, and mar resistance, 299  
  effects of, 302  
  *see also* Abrasion
- Fume resistance, of architectural paint, 427
- Fungus  
  affecting paint, 367, 368–370  
  resistance to  
    in architectural paint, 427  
    in tile-like coatings, 459
- G**
- Gages  
  for film thickness measurement, 260–265  
  fineness-of-dispersion, 233–235  
  flow, 201
- Galvanized steel, tests on, 382
- Gas adsorption, and particle size measurement, 228
- Gas chromatography, 530–542  
  for binder identification, 498  
  liquid, 530–539  
  solid, 539–540
- Gas resistance test, of varnishes, 419–420
- Gasoline, resistance to, 351
- Gel tests of metallic soaps, 75
- Gelation tests of oils, 66–67
- Gelling properties, of metallic soaps, 74–75
- Gibb's test, of alkyd resins, 100–101
- Glass beads  
  in test for drying time, 270  
  in traffic paint, 468  
  tests on, 468–469
- Glass mill, for pigment paste preparation, 42
- Glass substrates  
  black, 33–34  
  silvered, 259
- Glazing compounds, 445–454  
  flexibility of, 449  
  hardness of, 452  
  *see also* Sealants
- Gloss, 15–20  
  abrasion affecting, 303–304  
  absence-of-bloom, 15–16  
  aspects of, 15–16  
  of chromate pigments, 155

- contrast, 15  
 distinctness-of-image, 16  
   measurement of, 18, 19  
 instruments for measurements of, 17-18  
 of polishes, 440-441  
 and sheen, 15  
 specular, 15  
   evaluation of, 16  
   measurement of, 17, 18-19  
 standards for, 19-20  
   calibration of, 20  
   material for, 20  
 of tile-like coatings, 458  
 Glycerides, in waxes, 439  
 Gold pigments, synthetic, 156  
 Goniophotometers, 17  
 Grasse test, of drier metals, 73-74  
 Gravelometer, 306-307  
 Gravimetric method  
   for chlorendic acid in alkyd resins, 96-97  
   for particle size measurement, 228  
 Gravity  
   and sedimentation for particle size measurement, 222  
   specific (*see* Specific gravity)  
   in test for sealant adhesion, 451-452  
 Green pigments  
   chemical analysis of, 508-509  
   chrome, 155, 508-509  
   chromium oxide, 156, 509  
   copper phthalocyanine, 158  
   Guignet's green, 156  
 Griess test, for cellulosic resins, 103  
 Grindometer, use of, 234  
 Grooved rod applicators, for film preparation, 254  
 Guignet's green, 156
- ## H
- Hallett equation, 37  
 Hardness, 281-299  
   and abrasion resistance, 301  
   of artists colors, 291  
   indentation, 288-296  
   and mar resistance, 296-299  
   pendulum-rocker for measurement of, 284-288  
   of resins, 78  
   rocker, for drying time testing, 277-278  
   scratch, 281-284  
   of sealants, 452-453  
   testers of, 281-286  
   of tile-like coatings, 460  
 Heat  
   bleach, of oils, 65  
   bodying rate, of oils, 64-65  
   resistance to, 361-365  
   in printing ink, 491  
   and spontaneous combustion, 364-365  
   testers of, 363-364  
   tests with  
     for adulteration of oil, 66  
     for bituminous emulsions, 467  
     for sealants, 453  
   transfer of, and humidity tests, 341, 343  
 Heating of oils, loss on, 63-64  
 Hempseed oil, 53  
 Hesiometer, 319  
 Hexabromide yields of oils, 58-59  
 Hidimeter, 25  
 Hiding power, 22-38  
   basic factors in, 22  
   of colored pigments, 27  
   and contrast ratios, 22, 26  
   definition of, 22  
   determinations of, 22-23, 25, 29, 30  
     with black glass substrates, 33-34  
     with cardboard substrates, 32-33  
   early methods for, 23-25  
   later methods for, 29-36  
 Fell equation for, 27  
 and formulation of paints, 37  
 Kubelka-Munk theory of, 27-29  
   applications of, 36-37  
   Judd graph of, 28-29  
 of organic pigments, 22  
 and pigment volume concentration, 26, 35, 36-37  
 and reflectance versus film thickness, 25-26  
 and refractive indexes of pigments, 22  
 of tinted paints, 35-36  
 and tinting strength, 37-38  
 of titanium pigments, 34-35, 36-37  
 and visual sensitivity, 26  
 of white pigments, 22  
 of zinc sulfide pigments, 35  
 Holdout  
   of architectural paint, 425  
   of tile-like coatings, 458-459  
 Hot rolling method, for film preparation, 256  
 Humidity  
   affecting glass beads, 469  
   and blister formation, 341  
   and color retention of tile-like coatings, 459  
   and drying time, 269  
   and flexibility, 333  
   and heat transfer, 341, 343  
   and masonry painting, 434-435  
   test for, 345  
   *see also* Moisture  
 Hydraulic press method, for film preparation, 257  
 Hydrocarbons  
   in resins, solubility parameters of, 132  
   in waxes, 438  
 Hydrogen sulfide, affecting architectural paint, 427  
 Hydrometer, 167  
   for particle size measurement, 223  
 Hydrophil balance test, for adhesion, 330-331  
 Hydroxyethylcellulose, 122  
 Hydroxyl values  
   of alkyd resins, 103  
   of oils, 64  
 Hydroxypropyl methylcellulose, 122-123  
 Hygrometers  
   electric, 349-350  
   hair, 350  
   salt color-change, 350  
 Hygroscopic moisture, in pigments, 500
- ## I
- Illuminants, standard, 1  
 Illuminator-viewers, and rating of dispersion, 234-235  
 Illuminometer studies, of traffic paint visibility, 470  
 Immersion tests, of chemical resistance, 351-353  
 Impact tests  
   for adhesion, 330  
   for flexibility, 335-336  
   for sealant adhesion, 452  
   for tile-like coatings, 460  
 Imprint resistance, 294-295  
 Impurities (*see* Adulteration)  
 Indanthrone blue, 159  
 Indentation hardness, 288-296  
   and rheology, 291-294, 295  
   tests for, 288-291, 294-295  
   and viscosity of organic coatings, 295  
 Inductance gage, for film thickness measurement, 265  
 Inertia tests, for adhesion, 329-330  
 Influx viscometer, 200  
 Infrared  
   radiation, 3-4  
   spectrophotometry (*see* Spectrophotometry)  
   spectroscopy, 547-549  
 Ink  
   printing, 490-493  
   *see also* Printing ink  
   stains from, floor sealer resistance to, 421  
 Inkometer, use of, 493  
 Inorganic colored pigments, 154-156  
 Insect-resistant paints, 370  
 Inspection gage, for film thickness measurement, 263  
 Instrumental methods of analysis, 515-581  
   atomic absorption and flame emission spectroscopy, 550-552  
   chromatography, 522-542  
   constant-current coulometry, 560-561  
   differential thermal analysis, 562-563  
   infrared spectroscopy, 547-549  
   mass spectrometry, 553-554  
   microscopy, 515-521  
   nuclear magnetic resonance spectroscopy, 564-581  
   polarography, 556-559  
   ultraviolet spectroscopy, 545-546  
 Instrumentation  
   for color measurement, 10-12  
   for gloss measurements, 17-18  
   for mass color evaluation, 46-47  
   for tinting strength evaluation, 47-48  
   for viscosity studies, 182-202  
 Intaglio inks, 490  
 Integrity, concept of, 388-389  
 Interfacial forces of adhesion, 314-315  
 International Standards Organization, 584-585  
 Inter-Society Color Council, and ISCC-NBS color system, 8  
 Iodine value  
   of lac, 88  
   of oils, 57-58  
 Iron  
   blues, 155  
   chemical analysis of, 507  
   in copper pigments, 510  
   in driers, determination of, 73  
   oxides, 155-156  
   black, 160  
   in magnesium silicate pigment, 503  
   in red lead, 511  
   synthetic black, 160, 506  
   synthetic, chemical analysis of, 509-510  
   pyrophosphate, as extender, 160  
   in red pigments, 509-510  
   in rosin, 85  
   weathering tests on, 376-382  
   in zinc powder, 506  
 Isoindolinone pigments, 159  
 Isophthalic acid, in alkyd resins, 95-96
- ## J
- Japan wax, properties of, 437  
 Jet abrader, 305-306

- Jet test, liquid, for adhesion, 328  
 Judd graph, of Kubelka-Munk equations, 28–29
- K**
- Kauri-butanol value, and solvency, 133–135  
 Kauri reduction test, 417  
 Knife tests of adhesion, 315–319  
 Krebs test, for hiding power determination, 23  
 Kubelka-Munk equations  
   for color matching, 48–49  
   for hiding power, 27–29, 36–37  
   Judd graph of, 28–29  
   for mass color, 46  
   for tinting strength, 47
- L**
- Lac, 88–90  
   ash in, 90  
   color of, 90  
   copal in, 88  
   identification of, 77  
   insoluble matter in, 88  
   iodine value of, 88  
   matter soluble in water, 90  
   moisture in, 89–90  
   orpiment in, 90  
   purity of, 88  
   rosin in, 88–89  
   saponification value of, 90  
   test for impurities in, 89  
   wax in, 90  
 Lacquers  
   phthalic anhydride in, 94–95  
   plasticizer migration to, 421  
 Lampblacks, 160  
   chemical analysis of, 505–506  
 Latex paint  
   condition in container, 423  
   particle size of, 218  
   *see also* Architectural paint  
 Leach test, solvent, 163  
 Leaching rate, of antifouling paints, 481  
 Lead  
   cadmium, in zinc powder, 506  
   chromate  
     in ochre, 510  
     in yellow, orange, and green pigments, 508  
   in driers, determination of, 72, 73, 74  
   salt method, for phthalic anhydride in alkyd resins, 94  
   pigments, 150–151  
   red, 156, 511  
   silico-chromate, basic, chemical analysis of, 508  
   in tribasic lead phosphosilicate, 501  
   white, carbonate, 150, 501  
   in zinc oxide pigments, 502  
 Leafing test, for aluminum paint, 417–418  
 Length, of printing ink, 493  
 Leveling  
   of paints, 207–210  
   in test for sealants, 447  
 Licata gel test, of metallic soaps, 75  
 Light, 1–12  
   affecting drying time, 269  
   reflectance of, 5  
   resistance to, in printing ink, 491  
   sources of, 1–4  
   transmittance of, 5  
     and particle size measurement, 225–226
- Lightfastness of pigments, 411  
   in chromate pigments, 155  
 Line patterns, 388  
 Linseed oil, 53  
   boiled, detection of, 68  
 Liquid  
   Newtonian, 181  
   non-Newtonian, 181  
 Lithol red, 157  
 Lithopone, 150  
 Livering characteristics, in printing ink, 491  
 Lumbang oil, 53  
 Luminograms, ultraviolet, for cleanliness of steel panels, 379
- M**
- Magnesium  
   carbonate, as extender, 160  
   oxide, in magnesium silicate pigment, 503  
   panels of, for weathering tests, 383  
   silicate pigments, chemical analysis of, 503  
 Magnetic chuck, with doctor blade, 255  
 Magnetic gages, for film thickness measurement, 264–265  
 Magnetic resonance spectroscopy, nuclear, 564–581  
 Magnetic tack tester, 271  
 Maleic acid, in polyester resins, 97  
 Mandrels, for flexibility tests, 333–334  
 Manganese  
   in driers, determination of, 72, 73, 74  
   in red pigments, 509–510  
   in sienna and umber, 510  
 Mar resistance, 296–299  
   and abrasion resistance, 301  
   impinging abrasive method for, 297–298  
   miscellaneous methods for, 298–299  
   scuffing methods for, 298  
   single scratch methods for, 296–297  
 Marine environment paints, 478–485  
   antifouling, 479–481  
     *see also* Antifouling paint  
   cathodic protection of, 481–482, 483–484  
   rotor apparatus for testing of, 482, 484, 485  
   ship bottom coatings, 479  
   template inspection aid for, 480  
   test panels for, 478  
   tide range exposure tests of, 478  
 Maroons, 157, 159  
 Masonry  
   painting of, 429–435  
     *see also* Cement-base paint  
   weathering tests on, 383  
 Match test, vertical, for fire retardancy, 357  
 Matching of color  
   booth for, 2  
   instrumental, 37, 48–49  
 Materials (*see* Raw materials)  
 Mechanical properties of films, 281–340  
   abrasion resistance, 301–312  
   adhesion, 314–331  
   flexibility, 333–337  
   hardness, 281–299  
   tensile strength and elongation, 338–340  
 Melamine-formaldehyde  
   in alkyd resins, 99, 100  
   in nitrogen resins, 106  
 Melting point  
   bars for testing heat-resistant paint, 353  
   of resins, 79–81  
   of rosin, 85  
   of waxes, 436  
   *see also* Softening point
- Mercuric oxide pigment, 156  
   chemical analysis of, 511  
 Mercury, as substrate for free films, 258  
 Metal(s)  
   in driers, determination of, 72–74  
   stains from, 389–391, 400  
   weathering tests on, 376–383  
 Metal-glide adhesion test, of polishes, 441–442  
 Metallic pigments, 161–162  
   chemical analysis of, 506  
   particle size of, 218, 230  
 Metallic soaps, 71–75  
   tests on, 74–75  
 Metallized azo pigments, 157–158  
 Metamerism, 2–3  
 Meters  
   drying time, 274  
   indentation, 290  
   moisture, 348–349  
 Methylcellulose, 121–122  
 Mica pigment, chemical analysis of, 503  
 Microcharacter device, 282–283  
 Microcolorimetric method, for phthalic anhydride in alkyd resins, 95  
 Micro-cone and plate viscometer, 194  
 Microcrystalline wax, properties of, 436, 437  
 Micro-depth gage, for film thickness measurement, 262  
 Microindentation testers, 291, 293  
 Microknife, 283, 316–317  
 Micromerography, for particle size measurement, 223  
 Micrometers, for film thickness, 261  
 Microorganisms  
   affecting paint, 366–370  
   resistance to, 426  
 Microradiography, X-ray, for particle size measurement, 235–236  
 Microscopy, 515–521  
   electron, 517  
     of antifouling paints, 481  
     for particle size measurement, 220  
   for film thickness measurements, 262–264  
   light, 515–516  
     for particle size measurement, 220  
     for particle size measurement, 220, 517–521  
 Migration  
   of flooring ingredients into polish, 441  
   of oil from sealants, 453  
   of plasticizers to lacquer, 421  
 Mildew, 389  
 Mill, glass, for pigment paste preparation, 42  
 Minictector, for film thickness measurement, 265  
 Miscibility  
   of driers, 71  
   of solvent and resin, 130–131  
 Mixing of pigments with vehicles, 41–43  
 Mixtures of pigments, oil absorption in, 247–248  
 Mobilometers, 198–199, 203, 208  
   for viscosity of sealants, 445  
 Moisture  
   affecting glass beads, 469  
   and blistering of paint, 391–392, 398–399  
     *see also* Blister formation  
   and dew detectors, 392, 408  
   in lac, 89–90  
   and masonry painting, 434–435  
   meters for, 348–349  
     power loss type, 349  
     resistance type, 348–349  
   in oils, 64  
   in pigments, 500  
   in plasticizers, 125  
   from rainfall (*see* Rain)  
   in resins, 84

resistance to, 310, 341–350, 351  
 in bituminous emulsions, 467  
 in glass beads, 469  
 and moisture content of substrates, 348–350  
 rain and condensation, 343–346  
 in traffic paint, 473  
 and water vapor transmission, 341–343  
 from within structures, 346–348  
 in solvents, 146  
 in tall oil, 87  
 and water spotting of polishes, 440  
 and waterproofing with cement-base paint, 433–434  
 and wet feet test for concrete paint, 431  
*see also* Humidity  
 Mold, effects of, 367, 368–370, 389  
 Molybdate orange, chemical analysis of, 508  
 Montan wax, properties of, 437  
 Mullers, for mixing pigment and vehicle, 41, 43  
 Mylars, solubility parameters of, 132

## N

Naphthenates, 71  
 Naphthol reds, 157  
 Needle thickness gage, for film thickness, 262  
 Newtonian liquid, 181  
 Nickel  
 azo yellow, 158  
 in copper pigments, 510  
 Night visibility, of traffic paint, 470–472  
 Nitrate, cellulose (*see* Cellulose nitrate)  
 Nitrate test, of alkyd resins, 101  
 Nitrocellulose (*see* Cellulose nitrate)  
 Nitrogen  
 in plasticizers, 126  
 in resins, 106–110  
 Nitroso pigments, 158  
 Nomographs, for rating weathering, 393, 403–404  
 Nuclear magnetic resonance spectroscopy, 564–581

## O

Observer, standard, 4–5  
 Ochre pigments, chemical analysis of, 509–510  
 Odor  
 of printing ink, 491  
 residual, of plasticizers, 125  
 of solvents, 146, 147  
 Oils  
 absorption of  
 by cement, 430  
 by pigments, 239–249  
 by printing inks, 491  
 bulking values of, 174  
 chromatography of, 437–438  
 drying, 53–70  
*see also* Drying oils  
 fish oils, 53, 68–69  
 linseed oil, 53, 68  
 migration from sealants, 453  
 tall oil, 87–88  
*see also* Tall oil  
 tung (*see* Tung oil)  
 volatile, in rosin, 86  
 Oiticica oil, 53, 55  
 Opacity  
 of chromate pigments, 155  
 dry, federal test for, 31

Optical properties, 1–51  
 color and light, 1–12  
 gloss, 15–20  
 hiding power, 22–38  
 mass color and tinting strength, 41–50  
 Orange pigments  
 anthrathrone, 159  
 chemical analysis of, 508–510  
 chrome, 155  
 perinone, 159  
 Organic colored pigments, 156–159  
 hiding power of, 22  
 Orpiment, lac, 90  
 Ouricury wax, properties of, 437  
 Oven test of varnish films, 419–420  
 Overstripe bleed test, of pigments, 163  
 Oxide pigments, 155–156  
 green, chromium, 156  
 Oxides, as extenders, 160  
 Oxirane, in plasticizers, 126–127  
 Oxygen  
 in blown oils, 65–66  
 bomb aging test, of sealants, 454  
 Ozokerite wax, properties of, 437  
 Ozonization test, 410

## P

Packing factor, pigment, 244  
 Paint formula, yield of, 171, 176  
 Painting machines, 205–206  
 Palettes, permanent, 49–50  
 Panels for testing  
 concrete and masonry, 431  
 for electrocoating, 486, 487  
 marine, 478  
 metal, 376–383  
 radiant, for fire retardance, 359  
 wood, 373–376  
 Paper  
 for drying time test, 270  
 sized, as substrate for free films, 257  
 Para reds, 157  
 chemical analysis of, 511  
 Paraffin, 436, 437  
 Paramet method, for softening point of resins, 80–81  
 Particles  
 coarse, 231–236  
 in architectural paint, 423  
 in cement-base paint, 429  
 measurement of size, 218–237  
 of coarse particles, 231–236  
 with electronic size analyzer, 229–230  
 by elutriation, 227–228  
 of latexes, 218  
 of metallic flake pigments, 218, 230  
 methods of, 219  
 microscopy of, 220, 517–521  
 by photometry, 225–227  
 of pigments and extenders, 218  
 by sedimentation, 222–225  
 by sieving, 221–222, 231  
 from surface area, 228–229  
 Pass test, for adhesion, 322  
 Paste, for oil absorption test, 239  
 Pebble abrasion test, 303  
 Peel tests  
 for adhesion, 326–329  
 for bond strength of sealants, 450–451  
 Peeling, 388  
 Pencil test  
 for adhesion, 322  
 for scratch resistance, 283–284  
 Pendulum hardness testers, 284–288

Penetration  
 of architectural paint, 425  
 of bituminous coatings, 463  
 and viscosity of organic coatings, 295  
 Penetrometer, hardness, 291  
 for putty and glazing compound, 452  
 Perilla oil, 55  
 Perinone orange, 159  
 Permanent palettes, 49–50  
 Permeation method, for particle size measurement, 229  
 Peroxide values, in oils, 65–66  
 Perspiration, resistance to, 353  
 in varnish, 421  
 Perylene scarlet, 159  
 pH  
 of electrocoating, 486  
 of pigments, 500  
 of polishes, 440  
 Phenolic resins, 110–111  
 alkyd, 100  
 solubility parameters of, 132  
 Phenols, in plasticizers, 126  
 Philoscope, use of, 290  
 Phosphate pigments, 156  
 Phosphates  
 as extenders, 160–161  
 for treatment of galvanized steel, 382  
 Phosphorus  
 in plasticizers, 126  
 in tribasic lead phosphosilicate, 502  
 Photochemical embrittlement test, 410  
 Photographic illuminator-viewer, and rating of dispersion, 234–235  
 Photography, for traffic paint visibility studies, 471–472  
 Photometry  
 for iron in rosin, 85  
 for particle size measurement, 225–227  
 for traffic paint visibility studies, 471  
 Phthalates, in plasticizers, 126  
 Phthalic anhydride  
 in alkyd resins, 93–95, 100, 102  
 in lacquers, 94–95  
 Phthalocyanines, 158  
 Physical properties, 165–250  
 bulking values, 172–176  
 density, 165–171  
 oil absorption by pigments, 239–249  
 particle size measurement, 218–237  
 specific gravity, 167–170, 177–180  
 surface energetics, 213–217  
 viscosity and consistency, 181–210  
 Pigments, 150–164  
 and acid dye laking, 156  
 aluminate, 156  
 aluminum, 161  
 analysis of content in paints, 497  
 antimony trioxide, 151  
 azo, 156–158  
 condensation, 158  
 insoluble, 157  
 metallized, 157–158  
 black, 159–160  
 bronze, 161–162  
 bulking values of, 172–174  
 chemical analysis of, 500–514  
 chromate, 154–155  
 colored, 151–159  
 copper, 162  
 corrosion-inhibitive value of, 164  
 critical pigment volume, 243–247  
 and oil absorption, 246–247  
 density of (*see* Density)  
 dioxazine, 159



- end-use tests of, 163
  - extender, 160–161
  - ferrocyanide, 155
  - hiding power of, 22, 27, 34–35
  - inorganic, 154–156
  - isoindolinones, 159
  - lead, 150–151
  - lightfastness of, 411
  - liquid absorption by, 243
  - mass color and tinting strength of, 41–50
  - metallic, 161–162
    - particle size of, 218, 230
  - microscopy for identification of, 516
  - mixing with vehicle, 41–43
  - nitroso, 158
  - oil absorption by, 239–249
    - and critical pigment volume, 246–247
    - determination of, 239–242
    - and dispersion, 249–250
    - and free binder content, 242–243
    - nature of, 239
    - in pigment mixtures, 247–248
    - and viscosity, 247
  - organic, 156–159
  - oxide, 155–156
  - packing factor, 244
  - particle size of, 218
    - see also* Particles, measurement of size
  - phosphate, 156
  - phthalocyanine, 158
  - in printing ink, 491
  - refractive indexes of, 22
  - separation from paints, for analysis, 498
  - settling of, 170–171
    - in architectural paint, 423
    - in traffic paint, 468
  - silicate, 156
  - specific gravity of, 167–170, 177–180
    - in mixed pigments, 169
  - standards for federal specifications of, 49
  - sulfide and sulfoselenide, 155
  - testing of, 162–164
  - titanate, 156
  - titanium dioxide, 150
  - vat dye, 158–159
  - volume concentration of
    - and film thickness, 244
    - and film volume, 245
    - and hiding power, 26, 35, 36–37
    - and tinting strength, 48
  - weathering characteristics of, 164
  - white, 150–151
  - yield tables for, 177–180
  - zinc, 150, 162
- Pitch coatings, 462–467  
*see also* Bituminous coatings
- Planographic inks, 490
- Plaster cup test, of cement-base paint, 432
- Plastic flow, 181
- Plasticizers, 124–128
  - acidity of, 124
  - bulking values of, 176
  - chloride in, 126
  - chromatography of, 127–128, 539
  - color of, 124
  - compatibility of, 124
  - copper corrosion of, 124
  - distillation range of, 124
  - electrical properties of, 124
  - ester value of, 124
  - flash point of, 125
  - fluorescence of, 127
  - migration into lacquer films, 421
  - nitrogen in, 126
  - odor of, residual, 125
  - oxirane in, 126–127
  - phenols in, 126
  - phosphorus in, 126
  - phthalates in, 126
  - refractive index of, 125
    - and density, 127
  - sampling of, 125
  - solidification point of, 125
  - specific gravity of, 125
  - sulfur in, 126
  - viscosity of, 125
  - water in, 125
- Plastometers, 182
- Pneumatic microindentation apparatus, 293
- Poise, definition of, 181
- Polarography, 556–559
  - for phthalic anhydride in alkyd resins, 94
- Polishes, 439–444
  - field tests of, 443
  - gloss of, 440–441
  - metal-glide adhesion test of, 441–442
  - nonvolatile matter in, 439
  - powdering of, 441
  - removability of, 441
  - slip resistance of, 442–443
  - and softening of tile substrate, 442
  - test on films, 440–443
  - water spotting of, 440
- Pollutants, atmospheric, 413–414
- Polyacrylonitrile modification, of alkyd resins, 101
- Polyamides
  - resin, 109
  - solubility parameters of, 132
- Polyester resins, 92–103
  - solubility parameters of, 132
- Polyethylene, as substrate for free films, 259
- Polyurethane resins, 109–110
- Poly(vinyl chloride-acetate) modification of alkyd resins, 101
- Poppyseed oil, 55
- Portland cement, properties of, 429
- Potentiometry
  - for fatty acid in tall oil rosin, 86
  - for oil acid value, 56
  - for rosin acid value, 85
  - for saponification of oil, 56
- Pour point, of tall oil, 87
- Powder test, for drying time, 270
- Powdering, of polishes, 441
- Primer, absorption of, 425
- Primrose yellow, 155
- Printing ink, 490–493
  - acid value of, 491
  - bleeding of, 491
  - chemical resistance of, 491
  - color of, 491
    - strength of, 492–493
  - drying properties of, 491
  - fineness of dispersion of, 492
  - flowing properties of, 491
  - heat and light resistance of, 491
  - length of, 493
  - living characteristics of, 491
  - odor of, 491
  - oil absorption of, 491
  - pigments in, 491
  - specific gravity of, 491
  - tack of, 493
  - types of, 490
  - vehicles for, 491
  - viscosity of, 491
- Protection, and weathering, 389
- Pseudoplastic flow, 181
- Psychological color factors, 4
- Pull tester, portable, 324
- Pull-off test, spring scale, for adhesion, 324
- Pumice pigment, chemical analysis of, 503
- Pumping stability, of electrocoating paints, 487–488
- Purity, of lac, 88
- Putty, 445–454
  - hardness of, 452
  - shearing adhesiveness of, 447
  - tensile adhesiveness of, 449
  - working properties of, 445–447
  - see also* Sealants
- Pycnometer, use of, 165–166
- Pyrolysis
  - for binder identification, 498
  - and chromatography, 538–539
  - for resin identification, 92
- ## Q
- Quinacridone pigments, 159
- ## R
- Racks, for weathering tests, 371–373
- Radiant panel test, for fire retardance, 359
- Radiation
  - infrared, 3–4
  - nonvisible, 3–4
  - ultraviolet, 3
- Radioactivity, and sedimentation, for particle size measurement, 223
- Rain
  - resistance to, 310, 343–346
    - in cement-base paints, 434
  - simulation of, 405
- Rapeseed oil, 55
- Raw materials, 53–164
  - cellulosics, 119–123
  - driers and metallic soaps, 71–75
  - drying oils, 53–70
  - pigments, 150–164
  - plasticizers, 124–128
  - resins
    - natural, 76–90
    - synthetic, 92–115
  - solvents, 130–149
- Reactivity of varnishes, 418–419
- Reagent water, for chemical analysis of pigments, 500
- Red lead, 156
  - chemical analysis of, 511
- Red pigments
  - alizarine, 159
  - chemical analysis of, 509–514
  - ferrite, 156
  - lithol, 157
  - naphthol, 157
  - para, 157, 511
  - toluidine, 157, 511
- Reflectance, 5
  - of aluminized roof coating, 466
  - and film thickness, 25–26
  - of pigments, 162
  - specular, 16
  - of tinted paints, 35–36
- Refractive index
  - of oils, 62–63
  - of pigments, 22
  - of plasticizers, 125
    - and density, 127
  - of resins, 78
  - of solvents, 145

- Refractivity intercept, for solvents, 144  
 Removability of polishes, 441  
 Resin(s)  
   acid-bound, for coating of galvanized steel, 382  
   acrylic, 114–115  
     solubility parameters of, 132  
   acrylonitrile, 108–109  
   alkyd, 92–103  
     acid value of, 102  
     alcohols in, 98  
     benzoguanamine-formaldehyde in, 99, 100  
     benzoic acid in, 95–96  
     carboxylic acids in, 93–97  
     cellulose nitrate modification of, 101–102  
     chlorendic acid in, 96–97  
     fatty acids in, 97  
     Gibb's test of, 100–101  
     hydroxyl value of, 103  
     identification of, 92–93  
     isophthalic acid in, 95–96  
     melamine-formaldehyde in, 99, 100  
     nitrite test of, 101  
     phenol-formaldehyde in, 100  

-phenylphenol-formaldehyde test of, 101  
     phthalic anhydride in, 93–95, 100, 102  
     polyacrylonitrile modification of, 101  
     poly(vinyl chloride-acetate) modification of, 101  
     rosin in, 98  
     silicone modification of, 101  
     solubility parameters of, 132  
     styrene-modified, 98  
     terephthalic acid in, 95–96  
     unsaponifiable matter in, 102  
     urea-formaldehyde in, 98–100  
   amine, solubility parameters of, 132  
   bituminous (*see* Bituminous coatings)  
   bulking values of, 81, 174  
   cellulosic, 103–106  
     cellulose esters in, 104  
     cellulose ethers in, 104  
     cellulose nitrate in, 104–106  
     classification of, 103  
     colorimetric studies of, 105  
     Griess test for, 103  
     identification of, 103  
     infrared studies of, 103, 105–106  
     spectrometry of, 103  
     volumetric studies of, 104–105  
   chromatography of, 538–539  
   color test for, Brinker, 69  
   drip point of, 81  
   epoxy, 111–112  
     solubility parameters of, 132  
   hydrocarbon, solubility parameters of, 132  
   identification of, 76–77, 498  
   lac, 88–90  
     *see also* Lac  
   miscibility with solvents, 130–131  
   natural, 76–90  
     acid value of, 84  
     ash content of, 84  
     bulking value of, 81, 174  
     classification of, 76  
     commercial grades of, 77–78  
     dirt in, 81–84  
     hardness of, 78  
     identification of, 76–77  
     moisture content of, 84  
     nonvolatile content of, 81  
     refractive index of, 78  
     saponification value of, 84  
     softening point of, 79–81  
     solubility of, 81, 82–83  
   nitrogen, 106–110  
     benzoguanamine-formaldehyde in, 106–107  
     detection of, 106  
     melamine-formaldehyde in, 106  
     thiourea content of, 107–108  
     thiourea-formaldehyde in, 107  

-toluenesulfonamide-formaldehyde in, 110  
     urea content of, 107  
     urea-formaldehyde in, 107  
   phenolic, 110–111  
     alkyd, 100  
     solubility parameters of, 132  
   polyamide content of, 109  
   polyester, 92–103  
     acids in, 97  
     solubility parameters of, 132  
   polyurethane, 109–110  
   rosin, 84–87  
     *see also* Rosin  
   silicone, 112–113  
   solvents for, 130  
   synthetic, 92–115  
     identification of, 92  
   tall oil, 87–88  
   vinyl, 113–114  
 Resinates, 71  
 Resistance  
   to abrasion, 301–312  
   to chemicals, 351–354  
   to heat, 361–365  
   mar, 296–299  
   to microorganisms, 366–370, 426  
   to slipping, in polishes, 442–443  
   to water vapor and liquid, 310, 341–350, 351  
   to weathering, 371–414  
 Rheology, 181  
   indentation, 291–294, 295  
   and properties of architectural paint, 424  
   and properties of sealants and caulking compounds, 446, 447–448  
 Rheometer, indenting, 293–294  
 Rice bran wax, properties of, 437  
 Ring method, for surface tension measurements, 216  
 Road tests, of traffic paint, 473–474  
 Rockers, for hardness testing, 286–287  
 Rod applicators, grooved, for film preparation, 254  
 Roller particle size analyzer, 227  
 Roller spatter test, of architectural paint, 424  
 Rolling ball testers, for drying time, 277  
 Rolling properties, of architectural paint, 424  
 Roof coatings, settling test for, 465–466  
 Roof corner test, of fire retardancy, 357–358  
 Rosin, 84–87  
   acid value of, 85–86  
   acids in tall oil, 87  
   in alkyd resins, 98  
   ash in, 85  
   color of, 85  
   dirt in, 85  
   identification of, 76–77  
   iron content of, 85  
   in lac, detection of, 88–89  
   sampling of, 84–85  
   saponification value of, 86  
   in shellac, 89  
   softening point of, 85  
   solubility parameters of derivatives, 133  
   tall oil, fatty acids in, 86  
   unsaponifiable matter in, 86  
   in varnishes, 419  
   volatile oils in, 86  
   in waxes, 439  
 Rotational viscometers, 186–194  
 Rototinner, 194  
 Rubber, stains from, 351  
 Rubbing property, of varnish dry film, 420–421  
 Rubines, lithol, 157–158  
 Rubout method, for oil absorption test, 239  
 Russian adhesion test, 327  
 Rust  
   rating system for, 391  
   stains from, 389–391, 395–397  
   standards, 381

S

Safflower oil, 55  
 Sag test, of sealants, 447  
 Sagging  
   of bituminous coatings, 466  
   of paints, 206–207  
 Salt fog test, of chemical resistance, 353–354  
 Sampling  
   for analysis of whole paint, 495–496  
   for chemical analysis of pigments, 500  
   of plasticizers, 125  
   of rosins, 84–85  
 Sand, falling, in abrasion tests, 302, 303  
 Saponification value  
   of lac, 90  
   of oils, 56–57  
   of resins, 84  
   of rosin, 86  
   of tall oil, 87  
   of waxes, 438  
 Sawdust method, for spontaneous combustion test, 364  
 Scaling, 388  
 Scarlet, perylene, 159  
 Scheifele evaluation of weathering, 393  
 Schlyter test, for fire retardance, 359  
 Scraping  
   of steel test panels, 381  
   in tests of adhesion, 319–323  
 Scratch dynamometer, 283  
 Scratch gage, for film thickness measurement, 265  
 Scratch hardness, 281–284  
 Scratch resistance, 282  
 Scratch testers, 282, 283, 297, 298, 321–322, 323  
   for mar resistance, 296–299  
 Scratching tests of adhesion, 319–323  
 Scratchmaster, 321  
 Scrub resistance, of architectural paint, 428  
 Scrubbability, of tile-like coatings, 460  
 Scuffing methods, for mar resistance test, 298  
 Sealants, 445–454  
   adhesion of, 449–452  
   aging tests on, 453–454  
   chemical analysis of, 454  
   compression set of, 453  
   hardness of, 452–453  
   oil migration from, 453  
   rheological properties of, 446, 447–448  
   stability of, 454  
   stain tests of, 454  
   tack-free time of, 448  
   working properties of, 445–447  
 Sealers, floor, tests on, 421  
 Seamless floor testing, 460–461  
 Sediment, in polishes, 439  
 Sedimentation, for particle size measurement, 222–225  
 Selenium, with cadmium colors, 155

- Selflifting of varnish films, resistance to, 420
- Separation  
   of pigment and vehicle, in analysis of whole paint, 498  
   of solvent, in analysis of whole paint, 499
- Service performance, and abrasion resistance, 301-302
- Set time, of cement, 430
- Set-to-touch drying time, 269
- Setting characteristics, of bituminous emulsions, 466-467
- Settling of pigments, 170-171  
   in architectural paint, 423  
   in traffic paint, 468
- Settling test, of roof coatings, 465-466
- Shadow method, for contact angle determination, 216
- Shear/scratch tester, 282
- Shear tests  
   of adhesion, 325-326  
   of bond strength of sealants, 450
- Shearing adhesiveness, of putty, 447
- Sheen, 15
- Shellac varnish  
   color of, 421  
   drying time of, 421  
   nonvolatile content of, 421  
   rosin in, 89  
   tests on, 421
- Ship bottom coatings, 479
- Shrinkage, of caulking compounds, 448-449
- Siccometer, use of, 272
- Sidewall test, of fire retardancy, 358-359
- Sienna pigments, chemical analysis of, 509-510
- Sieving, for particle size measurement, 221-222, 231
- Sifter, sonic, for particle size measurement, 222
- Silica  
   in diatomaceous silica, 503  
   as extender, 160  
   in lead silico-chromate, 508  
   in magnesium silicate pigment, 503  
   in polishes, 439  
   in red lead, 511  
   in titanium pigments, 501  
   in tribasic lead phosphosilicate, 501
- Silicate pigments, 156  
   aluminum, 503  
   magnesium, 503  
   white lead, basic, 150, 501
- Silicates, as extenders, 161
- Silicone resins, 112-113  
   alkyd, 101
- Silvered glass, as substrate for free films, 259
- Skinning  
   of architectural paint, 423  
   of varnish, 418
- Slip resistance, of polishes, 442-443
- Slump tests, of sealants, 447-448
- Smog chambers, 414
- Smokey Joe oven test, of varnish films, 420
- Smoothness, of tile-like coatings, 458-459
- Soap titration method, for particle size measurement, 229
- Soaps, metallic, 71-75  
   properties of, 71  
   tests on, 74-75
- Sodium sulfide resistance, of glass beads, 469
- Softening, of tile substrate, from polishes, 442
- Softening point  
   of bituminous coatings, 463  
   of resins, 79-81  
   of wax, 436  
   see also Melting point
- Solidification point, of plasticizers, 125
- Solubility  
   of cellulose nitrate, 120  
   of resins, 81, 82-83  
   of solvents, 130-131, 135
- Solute absorption, and particle size measurement, 228-229
- Solvency, 130-135  
   and aniline point, 132-133  
   and kauri-butanol value, 133-135  
   and solubility parameters, 130-131, 135  
   and viscosity reduction, 131-135
- Solvent(s), 130-149  
   acid absorption by, 143-144  
   acidity and alkalinity of, 146-147  
   in bituminous coatings, 464-466  
   boiling point of, 139-140  
   bromine number for, 143-144  
   bulking values of, 175  
   chromatography of, 141-143, 535-537  
   for cleaning of metals, 378-379, 382  
   color of, 145  
   composition of, 141-145  
   density of, 145  
   dilution limit of, 135  
   dilution ratio of, 135  
   evaporation of, 135-141  
   flash point of, 140-141  
   identification and analysis of, 147-149  
   impurities of, 145-147  
   leach test, 163  
   mixtures of, 131  
   nonvolatile residue in, 146  
   odor of, 146, 147  
   physical properties of, 145  
   refractive index of, 145  
   refractivity intercept for, 144  
   resistance to, 353  
   separation from paints, for analysis, 499  
   and solvency, 130-135  
   specific gravity of, 145  
   specifications for, 147  
   sulfur compounds in, 146  
   viscosity of, 131  
     reduction of, 131-135  
   water contamination of, 146
- Solvent-type waxes, 439-440
- Sonic sifter, for particle size measurement, 222
- Soybean oil, 55
- Spattering, of architectural paint, 424
- Spatula, for mixing pigment and vehicle, 41
- Specific gravity  
   centrifuge methods for, 168  
   displacement method for, 170  
   of driers, 72  
   flotation method for, 170  
   hydrometer for, 167  
   of oils, 62  
   of pigments, 167-170, 177-180  
     in mixed pigments, 169  
   of plasticizers, 125  
   of printing inks, 491  
   of solvents, 145  
   vacuum method for, 167-168  
   of waxes, 438
- Specifications, 583-585  
   American National Standards Institute, 585  
   ASTM, 584  
   Bureau of Reclamation, 584  
   Coast Guard, 584  
   Corps of Engineers, Civil Works, 584  
   Department of Defense, 583-584  
   departmental, 583  
   federal, 583  
   International Standards Organization, 584-585
- Maritime Administration, 584
- National Paint, Varnish, and Lacquer Association, 584
- Society of Paint Technology, 584
- State Highway, 584
- Steel Structures Painting Council, 584
- Tennessee Valley Authority, 584
- Spectrometry  
   for acrylic resins, 114  
   for cellulose nitrate in alkyd resins, 101-102  
   for cellulosic resins, 103  
   mass, 553-554  
   for phthalate in alkyd resins, 102
- Spectrophotometry, 10-12  
   abridged, 11-12  
   for carboxylic acids in alkyd resins, 93  
   for cellulose nitrate, 105-106  
   for epoxy resins, 111-112  
   for iron in rosin, 85  
   for particle size measurement, 226  
   for phenolic resins, 111  
   for phthalic anhydride in alkyd resins, 94, 95  
   for silicone resins, 113  
   for synthetic resins, 92  
     alkyd, 93
- Spectroscopy  
   for binder identification, 498  
   flame emission, 550-552  
   infrared, 547-549  
   nuclear magnetic resonance, 564-581  
     applications of, 571-577  
     interpretation of, 567-571  
     theory of, 565-567  
   of traffic paint, 475  
   ultraviolet, 545-546
- Specular gloss (see Gloss, specular)
- Spermaceti wax, properties of, 437
- Spinning, for preparation of films, 257
- Spot tests  
   of bituminous coatings, 462-463  
   of chemical resistance, 351
- Spotting, water, of polishes, 440
- Spray, for preparation of films, 251
- Spraying properties, of architectural paint, 424
- Spreader, for film preparation, 253
- Spring scale pull-off test, of adhesion, 324
- Stability  
   of bituminous emulsions, 466, 467  
   of driers, 72  
   of polishes, 439-440  
   of sealants, 454  
   of traffic paint, 468
- Stains  
   from caulking compounds and sealants, 454  
   ink, resistance of floor sealers to, 421  
   metal, 389-391, 400  
   resistance to, 351-354  
     in architectural paint, 428  
     in tile-like coatings, 459  
   from rubber, 351  
   rust, 389-391, 395-397
- Standards  
   color, 9  
   rust, 381
- Stearic acid, in waxes, 439
- Steel panels for weathering tests, 376-382  
   blast cleaning of, 381-382  
   and cleanliness of surfaces, 379-380  
   galvanized, 382  
   pictorial standards for surfaces to be painted, 380-382  
   preparation for painting, 382  
   scraping and wire brushing of, 381  
   substrates for, 376-379
- Stick and wick test, for fire retardancy, 356-357

- Stoke, definition of, 181  
 Strain rate, and flexibility, 333  
 Strain/stress properties, 338–340  
 Stress/strain properties, 338–340  
 Strontium chromate pigment, 155  
   chemical analysis of, 509  
 Styrene  
   in alkyd resins, 98  
   solubility parameters of polymers of, 133  
 Substrates  
   affecting architectural paint, 423  
   glass, 33–34, 259  
   moisture content of, 348–350  
   polishes affecting, 441–442  
   thin substrates corrosion test, 411  
   tile, softening from polishes, 442  
 Suction plate, for film preparation, 255–256  
 Sulfate white lead, basic, 150  
   chemical analysis of, 501  
 Sulfates  
   in chrome green pigment, 509  
   in copper pigments, 510  
   as extenders, 161  
   in strontium chromate pigment, 509  
 Sulfide pigments, 155  
 Sulfoselenide pigments, 155  
 Sulfur  
   in plasticizers, 126  
   in polishes, 439  
   in solvents, 146  
   in zinc oxide pigments, 502  
   in zinc powder, 506  
 Sunflower oil, 55  
 Sunlamps, fluorescent, 409  
 Sunlight, simulation of, 405  
 Surface analyzer, for drying time, 277  
 Surface area, and particle size measurement, 228–229  
 Surface energetics, 213–217  
   and contact angle, 216–217  
   and free interfacial energy, 213–214  
   and surface tension measurements, 214–216  
 Surface profile, measurements of, 265–267  
 Surface tension, 213–214  
   measurements of, 214–216  
 Swinging beam, for hardness testing, 285
- T**
- T-bend, as flexibility test, 334  
 Tack  
   magnetic tester of, 271  
   of printing ink, 493  
 Tack-free drying time, 270–272  
   of sealants, 448  
 Tackmeter, 271–272  
 Tack-O-Scope, 493  
 Tall oil, 87–88  
   acid value of, 87  
   ash in, 87  
   fatty acids in, 88  
   in rosin, 86  
   moisture in, 87  
   pour point of, 87  
   rosin acids in, 87  
   saponification value of, 87  
   unsaponifiable matter in, 87  
   viscosity of, 87  
 Tapes  
   adhesive tape tests of adhesion, 327  
   crosshatch tape tests of adhesion, 328  
   for film preparation, 255  
 Tar coatings, 462–467  
   *See also* Bituminous preparations
- Temperature  
   color, 1–2  
   differential thermal analysis, 562–563  
   and drying time, 269  
   effects on varnish, 421  
   and flexibility, 333, 336  
   of sealants, 449, 451  
   freeze-thaw stability of architectural paint, 426  
   in sudden chill test, 411  
   *see also* Heat  
 Tenacity, of caulking compound, 449  
 Tensile adhesiveness  
   of putty, 449  
   tests for, 323–326  
 Tensile strength  
   and abrasion resistance, 301  
   and elongation, 338–340  
 Tensiometer, for leveling studies, 207–208  
 Tension, surface, 213–214  
   measurements of, 214–216  
 Terephthalic acid, in alkyd resins, 95–96  
 Test panels (*see* Panels for testing)  
 Thermal analysis, differential, 562–563  
 Thickness of film, measurement of, 260–267  
 Thiocyanate value, of oils, 60–61  
 Thioindigo maroon, 159  
 Thiourea, in nitrogen resins, 107–108  
 Thiourea-formaldehyde, in nitrogen resins, 107  
 Thixotrometers, 202  
 Thixotropy, 181  
 Throwing power, of electrocoating paints, 487  
 Tidal conditions, simulation of, 411  
 Tide range exposure tests, 478  
 Tile-like coatings, 456–460  
   ability to smooth concrete block, 457–459  
   abrasion resistance of, 460  
   adhesion tests of, 456–457  
   chemical resistance of, 459  
   color retention of, 459  
   fungus resistance of, 459  
   hardness of, 460  
   humidity affecting, 459  
   specifications for, 456  
   stain resistance of, 459  
   washability of, 459–460  
 Tile substrate, softening from polishes, 442  
 Tilting plate method, for contact angle determination, 216  
 Tinted paints, reflectance and hiding power of, 35–36  
 Tinting strength, 41–50  
   basic factors in, 41  
   and color matching, 48–49  
   of colored pigments, 43–44  
   determinations of, 44, 45, 46  
   and hiding power, 37–38  
   instruments for evaluation of, 47–48  
   and lightness, 48  
   and mixing of pigment and vehicle, 41–43  
   and pigment concentration, 48  
   of titanium pigments, 45  
   and tone, 48  
   visual rating of, 43–46  
   of white pigments, 44–45, 47  
   of zinc oxide pigments, 45  
 Tintograph, 44  
 Tintometer, 9  
 Titanate pigments, 156  
 Titanium dioxide, in zinc sulfide pigments, 502  
 Titanium pigments, 150  
   chemical analysis of, 500–501  
   hiding power of, 34–35, 36–37  
   tinting strength of, 45  
 Toluene dilution ration of cellulose nitrate, 120
- p*-Toluenesulfonamide-formaldehyde, in nitrogen resins, 110  
 Toluidine red pigments, 157  
   chemical analysis of, 511  
 "Tombstone" test, of masonry paints, 432–433  
 Tooth gages, for wet film thickness, 261  
 Torque tests, of adhesion, 326  
 Touch controller, for drying time determination, 273  
 Traffic paint, 468–477  
   abrasion resistance of, 312, 472–473  
   adulteration of, 474–477  
   bleeding resistance of, 473  
   chipping of, 473–476  
   flexibility of, 470  
   and glass beads testing, 468–469  
   night visibility of, 470–472  
   no-pick-up time for, 469–470  
   road tests of, 473–474  
   schedule of tests for, 468  
   stability and settling properties of, 468  
   water resistance of, 473  
   weathering tests of, 473  
 Transmission  
   of light, 5  
   and particle size measurement, 225–226  
   of ultraviolet radiation, by pigments, 163  
   of water vapor, 341–343  
 Trimmers, in bodied oil, 68  
 Tristimulus colorimeters, 12  
 Tung oil, 55  
   adulteration of, tests for, 66–68  
   optical dispersion of, 62–63  
 Tunnel tests, of fire retardance, 360–361  
 Turboviscometer, 190  
 Twisting cork tester, for indentation hardness, 294  
 Typographic inks, 490
- U**
- Ultracentrifuge  
   for adhesion test, 329–330  
   sedimentation by, 225  
 Ultramarine blue, 156  
   chemical analysis of, 508  
 Ultrasonic vibration test, for adhesion, 329  
 Ultraviolet luminograms, for cleanliness of steel panels, 379  
 Ultraviolet radiation, 3  
   and fluorescent sunlamps, 409  
 Ultraviolet spectrophotometry (*see* Spectrophotometry)  
 Ultraviolet spectroscopy, 545–546  
 Umber pigments, 156  
   chemical analysis of, 509–510  
 Uniformity, of bituminous emulsions, 466  
 Unsaturation, in fats and oils, 57–61  
 Urea, in nitrogen resins, 107  
 Urea-formaldehyde  
   in alkyd resins, 98–100  
   in nitrogen resins, 107  
 Urethan materials, in resins, 109–110
- V**
- Varnish  
   clear floor sealer tests of, 421  
   dry film, 419–421  
   hardness and abrasion resistance of, 421  
   irregularities in, 419–420  
   plasticizer migration to, 421  
   resistance to perspiration, 421  
   rubbing property of, 420–421

- selflifting of, 420
  - temperature change resistance of, 421
  - liquid, 415–419
    - acid value of, 419
    - alkali increase test of, 419
    - appearance of, 415
    - color of, 415
    - density of, 417
    - drying time of, 419
    - elasticity of, 417
    - flash point of, 417
    - leafing test of, 417–418
    - nonvolatile content of, 415–417
    - reactivity tests of, 418–419
    - rosin content, of, 419
    - skinning of, 418
    - viscosity of, 415
  - shellac (*see* Shellac varnish)
  - test on, 415–421
  - Vat dye pigments, 158–159
  - Vehicle separation from paints, for analysis, 498
  - Venetian red, chemical analysis of, 509–510
  - Vibration, ultrasonic, in adhesion test, 329
  - Vicateter, for indentation, 292–293
  - Viewers, for rating of dispersion, 234
  - Vinyl resins, 113–114
  - Vinyls, solubility parameters of, 133
  - Violet, carbazole dioxazine, 159
  - Viscometers
    - band, 197
    - bubble, 197–198
      - interchemical, 198
    - capillary, 182–183
    - cone and plate, 194
    - efflux type, 183–186
    - falling ball, 194–197
    - influx, 200
    - recording, 190
    - rotational, 186–194
      - high-shear, 190–191, 204
      - interchemical, 191–192
    - vertical, 197–198
  - Viscosity, 181–210
    - absolute dynamic, 181
    - of architectural paint, 424
    - of bituminous coatings, 464
    - and brushability, 202–206
    - of cellulose acetate, 120
    - of cellulose derivatives, 195–196
    - of cellulose nitrate, 119–120
    - and consistency index, 208
    - of driers, 72
    - of ethylcellulose, 121
    - of hydroxypropyl methylcellulose, 122
    - instruments for studies of, 182–202
    - kinematic, 181
    - and leveling, 207–210
    - of methylcellulose, 121–122
    - and oil absorption, 247
    - of oils, 63
    - of organic coatings, and penetration, 295
    - plastic, 181
    - of plasticizers, 125
    - of printing ink, 491
    - and sagging, 206–207
    - of sealants, 445–446
    - of sodium carboxymethylcellulose, 122
    - of solvents, reduction of, 131–135
    - of tall oil, 87
    - of varnish, liquid, 415
  - Viscosity cups, 184, 185, 186
  - Visibility, night, of traffic paint, 470–472
  - Vitreous coatings, applied to rough masonry, 457–459
  - Volatile oils, in rosin, 86
  - Volumeter, 169
  - Volumetric methods
    - for cellulose nitrate, 104–105
    - for phthalic anhydride in alkyd resins, 94
- ## W
- Washability
    - of architectural paint, 427–428
    - of tile-like coatings, 459–460
  - “Washing” of paints, 392–393
  - Water
    - adsorption of vapor, and particle size measurement, 228
    - analysis in paint, 497–498
    - in bituminous coatings, 465
    - effects on paint (*see* Moisture)
    - liquid jet test of adhesion, 328
  - Water-break test, for cleanliness of steel panels, 379
  - Water-emulsion waxes, 439–440
  - Waterproofing, with cement-base paint, 433–434
  - Waxes, 436–444
    - acid value of, 438
    - congealing point of, 436
    - crystallinity of, 438
    - emulsion-type, 438–440
    - glycerides in, 439
    - hydrocarbons in, 438
    - lac in, 90
    - melting point of, 436
    - rosin in, 439
    - saponification value of, 438
    - solvent-type, 439–440
    - specific gravity of, 438
    - stearic acid in, 439
  - Wear tests, 307, 309–310
  - Wearometer, 303
  - Weathering, 371–414
    - on aluminum, 382–383
    - and appearance, 384
    - application of paints in tests of, 373
    - artificial, 405–414
      - and actinic values, 410
      - intensified tests in, 410–412
      - machines for 405–410
      - of sealants, 453–454
    - and blistering of paint, 391–392, 398–399
    - and chalking, 384–387
    - and checking and cracking, 387–388
    - and color retention, 391
    - critical performance index in tests of, 394
    - and dew detectors, 392, 408
    - and dirt and mold retention, 389
    - and effects of climate, 371
    - and effects of moisture (*see* Moisture)
    - evaluation of tests of, 383–392
    - and exposure test record, 401–402
    - and flaking, scaling and peeling, 388
    - and flexibility tests, 336–337
    - and integrity, 388–389
    - on iron and steel, 376–382
    - on magnesium, 383
    - on masonry, 383
    - and metal stains, 389–391, 400
    - natural, 371–404
    - nomographs for tests of, 393, 403–404
    - and pigment characteristics, 164
    - and protection, 389
    - racks for tests of, 371–373
    - recording of tests for, 393
    - and rust stains, 389–391, 395–397
    - Scheifele summary of tests for, 393
    - of traffic paint, 473
  - and “washing” of paints, 392–393
  - on wood, 373–376
  - Weather-Ometers, 406–407, 408
  - Wedge test, liquid, for adhesion, 328–329
  - Weight per gallon, 166
  - Wet-abrasion machine, 310–311
  - Wet-edge time, of architectural paint, 424
  - Wet feet test, for concrete paint, 431
  - Wet film gage, 260
  - Wet film thickness, 260–261
  - Wet flow, of bituminous emulsions, 466
  - Wet point, 249
  - Wetting, 213
  - Wheel, for artificial weathering, 405–406
  - White lead, carbonate, 150, 501
  - White pigments, 150–151
    - chemical analysis of, 500–503
    - in mixed pigments, 504–505
    - hiding power of, 22
    - mass color of, 43, 46
    - tinting strength of, 44–45, 47
  - Window adhesion test, 320
  - Wire brushing, of steel panels, 381
  - Wood
    - adhesion test on wood cross, 324
    - fire retardance of shingles, 355
    - weathering tests on, 373–376
  - Working properties
    - of architectural paint, 424
    - of caulking compounds, 445–447
    - of putty, 445–447
    - of sealants, 445–447
  - Worn areas, restored with clear floor sealers, 421
- ## X
- Xanthhydrol test, for urea-formaldehyde in nitrogen resins, 107
  - X-ray microradiography, for particle size measurement, 235–236
  - X-ray scattering, for particle size measurement, 227
- ## Y
- Yellow oxides, 156
    - anthrapyrimidine, 159
    - chemical analysis of, 508–510
    - chrome, 154
    - diarylide, 157
    - nickel azo, 158
  - Yellowness index, of architectural paint, 428
  - Yield
    - liquid and pigment tables of, 177–180
    - of paint formula, 171, 176
- ## Z
- Zapon tester, for drying time, 270–271
  - Zinc
    - in copper pigments, 510
    - in driers, 73, 74
    - oxide, in zinc powder, 506
    - phosphate, as extender, 161
    - in red lead, 511
  - Zinc pigments, 150, 162
    - chromate, 155
    - oxide
      - chemical analysis of, 502
      - tinting strength of, 45
    - sulfide
      - chemical analysis of, 502
      - hiding power of, 35
      - yellow, chemical analysis of, 509