

Contents

Preface	vii
Introduction	viii
Part 1: Regulations	1
Chapter 1—Regulation of Volatile Organic Compound Emissions from Paints and Coatings	3
<i>J. John Brezinski and Ronald K. Litton</i>	
Part 2: Naturally Occurring Materials	17
Chapter 2—Bituminous Coatings	19
<i>Ben J. Carollozo</i>	
Chapter 3—Cellulose Esters of Organic Acids.....	27
<i>Jos S. de Wit and Deep Bhattacharya</i>	
Chapter 4—Drying Oils	32
<i>Joseph V. Koleske</i>	
Chapter 5—Driers and Metallic Soaps	38
<i>Marvin J. Schnall</i>	
Part 3: Synthetic Materials	47
Chapter 6—Acrylic Polymers as Coatings Binders	49
<i>John M. Friel and Edwin Nungesser</i>	
Chapter 7—Alkyds and Polyesters.....	65
<i>Dan Nelson</i>	
Chapter 8—Amino Resins (Reaction Products of Melamine, Urea, etc., with Formaldehyde and Alcohols).....	72
<i>William Jacobs</i>	
Chapter 9—Ceramic Coatings.....	81
<i>Richard A. Eppler</i>	
Chapter 10—Epoxy Resins in Coatings	87
<i>Michael J. Watkins</i>	
Chapter 11—Phenolics	93
<i>John D. Fisher</i>	
Chapter 12—Polyamides.....	97
<i>Robert W. Kight</i>	
Chapter 13—Polyurethane Coatings	102
<i>Han X. Xiao and Joseph V. Koleske</i>	
Chapter 14—Silicone Coatings	113
<i>D. J. Petraitis</i>	
Chapter 15—Vinyl Polymers for Coatings	118
<i>Joseph V. Koleske</i>	
Chapter 16—Miscellaneous Materials and Coatings	128
<i>Joseph V. Koleske</i>	
Part 4: Plasticizers	137
Chapter 17—Plasticizers	139
<i>Peter Tan and Leonard G. Krauskopf</i>	
Part 5: Solvents	147
Chapter 18—Solvents	149
<i>Stephen A. Yuhas, Jr. and Rey G. Montemayor</i>	
Part 6: Pigments.....	183
Chapter 19—White Pigments	185
<i>Juergen H. Braun</i>	
Chapter 20—Black Pigments.....	204
<i>Frank R. Spinelli</i>	

Chapter 21—Colored Organic Pigments	215
<i>Paul Merchak</i>	
Chapter 22—Inorganic Colored Pigments	234
<i>Peter A. Lewis</i>	
Chapter 23—Ceramic Pigments	239
<i>Richard A. Eppler</i>	
Chapter 24—Extender Pigments	242
<i>Richard A. Eppler</i>	
Chapter 25—Metallic Pigments	250
<i>Russell L. Ferguson</i>	
Chapter 26—Effect Pigments	256
<i>Paul J. Nowak</i>	
Chapter 27—Measurement of Gonioapparent Colors	272
<i>Allan B. J. Rodrigues</i>	
Chapter 28—Protective Coatings and Inorganic Anti-Corrosion Pigments	282
<i>Lucien Veleva</i>	
Chapter 29—Oil Absorption of Pigments	300
<i>Charles W. Glancy</i>	
Part 7: Additives	311
Chapter 30—Bactericides, Fungicides, and Algicides	313
<i>Janet H. Woodward</i>	
Chapter 31—Surfactants	320
<i>Elvira Stesikova and Heinz Plaumann</i>	
Chapter 32—Coalescing Aids	332
<i>Kevin W. McCreight</i>	
Chapter 33—Thickeners and Rheology Modifiers	341
<i>Gregory D. Shay</i>	
Part 8: Physical Characteristics of Liquid Paints and Coatings.....	373
Chapter 34—Density and Specific Gravity.....	375
<i>Raymond D. Brockhaus and Ben J. Carollozo</i>	
Chapter 35—Characterizing Particle Size and Size Distribution	389
<i>George D. Mills</i>	
Chapter 36—Rheology and Viscometry.....	415
<i>Richard R. Eley</i>	
Chapter 37—Surface Energetics.....	452
<i>Gordon P. Bierwagen, Andrew Huovinen, and Bobbi Jo Merten</i>	
Chapter 38—Solubility Parameters	470
<i>Charles M. Hansen</i>	
Part 9: Films for Testing	495
Chapter 39—Cure: The Process and Its Measurement	497
<i>Thomas J. Miranda</i>	
Chapter 40—Film Preparation for Coating Tests	505
<i>Robert D. Athey, Jr.</i>	
Chapter 41—Measurement of Film Thickness.....	514
<i>John Fletcher and Joseph Walker</i>	
Chapter 42—Drying Time	528
<i>Thomas J. Sliva</i>	
Part 10: Optical Properties	533
Chapter 43—Color and Light	535
<i>Robert T. Marcus</i>	

Chapter 44—Gloss	558
<i>Gabriele Kigle-Böckler and Harry K. Hammond III</i>	
Chapter 45—Hiding Power	569
<i>Leonard Schaeffer</i>	
Chapter 46—Mass Color and Tinting Strength of Pigments	591
<i>Joseph V. Koleske</i>	
Part 11: Physical and Mechanical Properties	599
Chapter 47—Adhesion	601
<i>Gordon L. Nelson</i>	
Chapter 48—Abrasion Resistance	615
<i>Daniel K. Slawson</i>	
Chapter 49—Dynamic Mechanical and Tensile Properties	624
<i>Loren W. Hill</i>	
Chapter 50—Flexibility and Toughness	637
<i>John Fletcher and Joseph Walker</i>	
Chapter 51—Understanding Osmotic Activity in Paint Films and Determining Cause by Systematic Analysis of Blister Fluids and Blistered Coatings	644
<i>George Mills</i>	
Chapter 52—Stress Phenomena in Organic Coatings	655
<i>Dan Y. Perera</i>	
Chapter 53—Friction and Slip Resistance	673
<i>Joseph V. Koleske</i>	
Part 12: Environmental Resistance	685
Chapter 54—Prevention of Metal Corrosion with Protective Overlays	687
<i>William H. Smyrl</i>	
Chapter 55—Types of Metal Corrosion and Means of Corrosion Protective by Overlays	697
<i>Kenneth B. Tator and Cynthia L. O’Malley</i>	
Chapter 56—Accelerated Weathering	715
<i>Valerie S. Sherbondy</i>	
Chapter 57—Chemical Resistance	725
<i>Latoska N. Price</i>	
Chapter 58—Water-Resistance Testing of Coatings	731
<i>John Fletcher and Joseph Walker</i>	
Part 13: Specific Product Testing	737
Chapter 59—Aerospace and Aircraft Coatings	739
<i>Charles R. Hegedus, Stephen J. Spadafora, Anthony T. Eng, David F. Pulley, and Donald J. Hirst</i>	
Chapter 60—Architectural Coatings	751
<i>Neal Rogers</i>	
Chapter 61—Artists’ Paints	765
<i>Benjamin Gavett</i>	
Chapter 62—Can Coatings	770
<i>Joseph V. Koleske</i>	
Chapter 63—Testing of Industrial Maintenance Coatings	778
<i>Dwight G. Weldon</i>	
Chapter 64—Pipeline Coatings	787
<i>Alfred Siegmund</i>	
Chapter 65—Sealants	792
<i>Saul Spindel</i>	
Chapter 66—Pavement Marking Materials	799
<i>James R. Swisher</i>	

Chapter 67—Water-Repellent Coatings.....	807
<i>Victoria Scarborough and Thomas J. Sliva</i>	
Part 14: Analysis of Paint and Paint Defects.....	811
Chapter 68—Analysis of Paint	813
<i>Darlene Brezinski</i>	
Chapter 69—The Analysis of Coatings Failures	830
<i>George D. Mills</i>	
Part 15: Instrumental Analysis	849
Chapter 70—Atomic Absorption, Emission, and Inductively Coupled Plasma Spectroscopy	851
<i>Dwight G. Weldon</i>	
Chapter 71—Chromatography	856
<i>Rolando C. Domingo and updated by Rey G. Montemayor</i>	
Chapter 72—Electron Microscopy Overview with Coating Applications	881
<i>David R. Rothbard and John G. Sheehan</i>	
Chapter 73—Infrared Spectroscopy.....	895
<i>Dwight G. Weldon</i>	
Chapter 74—Methods for Polymer Molecular Weight Measurement	908
<i>Thomas M. Schmitt</i>	
Chapter 75—Ultraviolet/Visible Spectroscopy	914
<i>George D. Mills</i>	
Chapter 76—X-Ray Analysis	920
<i>A. Monroe Snider, Jr.,</i>	
Part 16: Specifications.....	941
Chapter 77—Paint and Coating Specifications and Standards	943
<i>Joseph V. Koleske</i>	
Part 17: New Coating Technology	949
Chapter 78—Radiation Curing of Coatings	951
<i>Joseph V. Koleske</i>	
Chapter 79—Powder Coating.....	957
<i>Joseph V. Koleske</i>	
Appendix	962
Index.....	965