

Contents

1	Formulae and data	7
	SI units	7
	Multiples	7
	Sub-multiples	8
	Physical quantities	8
	Boiling point	8
	Evaporation rate and number	8
	Density (ρ)	8
	Refractive index (n)	9
	Surface and interfacial tension	9
	Rheology	9
	Colorimetry	13
	GHS symbols	15
	Periodic table of the elements	17
2	Raw materials	21
2.1	Binders	21
	Film formation mechanisms	22
	Polymers	23
	Polyacrylates and polymethacrylates	23
	Polyvinyl esters	26
	Polyvinyl alcohol (PVA)	27
	Polyvinyl acetals	27
	Polyvinyl chloride	28
	Polycondensation resins	29
	Polyester resins and acrylic resins	29
	Amino-formaldehyde resins	32
	Phenol-formaldehyde resins	35
	Silicone resins	36
	Polyaddition resins	38
	Polyisocyanates, polyurethane resins	38
	Epoxy resins	42
	Natural product derivatives	44
	Cellulose derivatives	44
	Rubber derivatives	45

2.2	Solvents	46
	Solvent categories	48
	Aliphatic hydrocarbons	48
	Cycloaliphatic hydrocarbons	48
	Terpene hydrocarbons	48
	Aromatic hydrocarbons	49
	Alcohols	49
	Glycol ethers	49
	Esters	50
	Glycol esters	50
	Ketones	50
	Water	51
	Properties from a coatings technology point of view	51
2.3	Colorants	59
	Extenders	59
	Silicate extenders	60
	Oxides as extenders	62
	Carbonates as extenders	62
	Sulphates as extenders	63
	Pigments	64
	Inorganic pigments	64
	White pigments	64
	Black pigments	65
	Iron oxide pigments	67
	Mixed phase oxide pigments	68
	Chromium oxide pigments	69
	Bismuth vanadate pigments	69
	Ultramarine pigments	69
	Iron-blue pigments	70
	Anticorrosive pigments	70
	Effect pigments	72
	Organic pigments	77
	Mono azo pigments	77
	Diazo pigments	80
	Polycyclic pigments	82
	Metal-complex pigments	88

2.4	Additives	90
	Driers/siccatives	90
	Anti-skinning agents	91
	Catalysts	91
	Stabilisers	92
	Thickeners and Rheological Additives	93
	Surfactant additives	95
3	Coating formulation	105
	Chemical characterisation of binders	107
	Crosslinking ratios	108
	Pigment volume concentration (PVC)	109
	Critical pigment volume concentration (CPVC)	109
	Pigment-to-binder ratio	110
	Calculating mixtures	110
4	Paint production	111
	Dispersing	112
	Predispersing step	112
	Main dispersing step	114
	Filtration	115
5	Paint application	118
	Pre-treatment methods	118
	Application methods	118
	Author	121