

CONTENTS AND SUBJECT INDEX

INTRODUCTION	1.
--------------------	----

PART I. CELLULOSICS

DIMETHYLOLDIHYDROXY ETHYLENE UREA (DMDHEU) AND RELATED COMPOSITIONS.	4
Catalysts	4
Zinc Nitrate Activating Catalyst	4
Zinc and Aluminum Acetate.	6
Alkali Metal Chlorides and Nitrates.	7
Fluoborate, Magnesium Chloride and Lithium Chloride	9
Magnesium Chloride and Cyanoacetic Acid.	12
Trichloroacetic Acid	12
Hydroxymonocarboxylic Acid	13
Odor-Free Hydroxymethanesulfonic Acid.	13
N,N-Diethylaziridinium Chloride.	15
High Concentration of Ammonium Chloride or Ammonium Nitrate.	15
Ammonium Chloride and Phosphoric Acid	16
Amine Salts and Fatty Quaternary Ammonium Compounds.	17
Hydrolyzable Amine or Imine Salts of Strong Acids.	19
Acetoxymethyl Methyl Carbamate as Catalyst Assist Agent	21
Concentrated Sulfuric Acid.	23
Azeotropic Liquid Containing Acidic Catalyst	23
Acetic or Formic Acid Vapors.	25
Hydrogen Halide Gas.	28
Curing Catalyst Added to Dried and Set Treated Textile.	28
Bath Additives.	29
Sequestering Agents	29
Dimethyl Sulfoxide.	31
Fischer-Tropsch Waxes as Lubricants	32
Cationic and Anionic Surfactant Blend	32
Sodium Tetraborate and Sodium Formate	34
Alkali Metal Borates	35
Use of Inert Additives in Fixation Step.	35
Polycarboxylic Acids.	38
DMDHEU and Optical Brighteners	40
Polyvinylpyrrolidone.	40
Polyvinylpyrrolidone-Polyacrylate Copolymer	41

Alkylpolyethylene Oxide Alcohols	41
α -Hydroxycarboxylic Acid as Catalyst	42
Aminoalcohols as Reactants	43
DMDHEU with Other Aminoplasts.. . . .	44
Polymethylol Melamines for Direct Dyed Material	44
Methylolated Triazines.	45
N,N'-Dimethylol Uron.	46
Thiourea-Trisaziridinylphosphine Oxide Copolymerization in First Stage.	47
2-Acrylamido-2-Methylpropanesulfonic Acid Polymers.	49
Urea-Formaldehyde Condensate	50
Cyanuric Chloride-Thiourea-Monoethanolamine Condensates.	52
N-Methylolactamide and Lactamide.	54
Polyurethane-Polyurea	59
DMDHEU and Related Synthetic Processes.	59
Low Formaldehyde/Urea Mol Ratio and pH Control	59
Reaction of Excess Formaldehyde with Glyoxal and Urea	61
Three-Stage Urea-Formaldehyde-Glyoxal Reaction Process.	62
N-Methylol-N'- β -Hydroxyethyl Imidazolidone	62
Dimethylpropyleneurea Compounds.	64
Dimethylol Ethylene Urea.	67
Nonaqueous Crosslinking in Absence of Catalyst	67
Imine-Terminated Polymers	68
CARBAMATES.	71
Low Formaldehyde Odor	72
Melamine Reaction.. . . .	72
Mixtures with Imidazolidinones	73
Reaction with Phthalimide in Bath.	73
Pyrrolidone Treatment	73
Acetylated Methylol Carbamates.	74
Aeration Technique Using Moist Air.	75
Carbamate Formulations.	75
N,N-Dimethylol Carbamates of Ether Alcohols.	75
Alkyl Carbamate/Isopropyl Carbamate-Formaldehyde Resins.	77
Aldehyde-Ketone-Carbamate Condensates	80
Ethylene Oxide Adducts of Methylolated Carbamates	81
Methylolated Alkoxyalkyl Carbamates	85
Tris[N,N-Bis(Hydroxymethyl) Carbamyl Acid Esters	87
Dehydration at Ambient Conditions.	89
Processing Variations.	90
Sodium Bisulfite Treatment	90
High Oxidizing Capacity Using Hypobromite Treatment.	92
Anhydrous Treatment Followed by Exposure to Water Vapor.	93
Impregnation with Formaldehyde-Methyl Carbamate Mixtures.	94
N-METHYLOLACRYLAMIDES AND OTHER NITROGEN-CONTAINING	
COMPOUNDS.	96
N-Methylolacrylamides	96
Two-Step Process	96
Carboxy-Containing Polymethylolamide Compounds.	98
Citric Acid or Dicyandiamide	101
Potassium Iodide Crosslinking Inhibitor	103
Single-Step Reaction Using Zinc Nitrate.	104
Aluminum, Zinc and Zirconium Salts.	104
Tertiary Bisacrylamides.	106
Polymeric Amides and Acidified-Dehydrating Formaldehyde Solution.	107
Polyurethane and Other Polymeric Compositions.	109
Neoprene Elastomer, Polyisocyanate and Metal Oxide	109
Functional Acrylic Polymers and Polyisocyanate-Polyol.	111

Aziridine-Modified Polyurethanes	112
Bis(4-Isocyanatocyclohexyl)Methane in Dimethylformamide	112
Substituted Ureas and Polyurethane Polymers	113
In Situ Formation of Condensation Polymers	117
Impregnation with Acrylonitrile, Styrene and Methyl Methacrylate	120
Other Compounds	122
Methanesulfonamide-Urea-Formaldehyde Reaction Product	122
Ethylene Glycol-Formaldehyde-Glyoxal and Urea	123
Bispyrrolidone-Formaldehyde Addition Products	124
Urea-Formaldehyde Impregnant in Acid Medium	125
Formaldehyde-Alkylsulfonamide Reaction Products	127
Formaldehyde. Cyanamide and Ammonium Salt Catalysts	128
Succinimide or Methylformamide-Glyoxal Reaction Products	129
Dimethylol-N,N'-Ethylenebisimidazolidone	131
1,3-Bis(Hydroxymethyl)-2-one-5-Alkylcarboxylate-1,3,5-Hexahydrotriazines	132
Butadiene-Styrene-1,3,5-Trimethylotriazine-2,4,6-Triol Polymer	133
Triazin-4-one Compounds	134
1,3,5-Trimethylotriazine-2,4,6-Triol and Methylol Stearamide	135
N-Hydroxymethyl Dione Compounds	136
Aromatic Alkyl Ethers of Hexamethylolmelamine	137
2,7-Dioxo-4,5-Dimethyldecahydro[4,5-d] Pyrimidine	139
Crotonylidenediurea-Aldehyde Reaction Products	142
Polythiol Esters and Aminoplast	142
Bis(Sulfonamido)Aziridine Compounds	146
AMINOPLASTS—GENERAL PROCESSING TECHNIQUES	149
General Processing	149
Two-Step Curing Process	149
Two-Phase System Containing Liquid Droplets of Resin Solution	150
Superheated Steam	152
Steam Fixation	152
Controlled Moisture Content During Storage Period	152
Pressure Wet Fixation	153
Kiss Roll Technique with Controlled Bath Applications	153
Impregnation with Agents of Different Condensation Characteristics	156
Swelling, Monosubstitution and Crosslinking	157
Shaping, Stretching and Application of Tension	158
Continuous Production of Stretch Cotton	158
Microlength Stretching	160
Removal of Alkali in the Stretched State	161
Tension Mercerization with Liquid Ammonia	161
Tension Applied in Filling Direction	162
Quaternary Ammonium Hydroxide Cellulose Plasticizing Agents	162
Controlled Crosslinking at Periphery of Fiber	164
Solvent Processing	166
Solvent Vapor Fiberset Process	166
Chlorinated Ethylene Carbonates	169
Chlorinated Solvent and Steam Treatment	170
Chlorinated Hydrocarbon Solvents	171
Other Processes	172
Storable, Activated Textile Product	172
Spray Composition for Home Use	173
Pyrrolidone as Stabilizer for Spray Dried Agent	173
Pretreatment with Bis(4-Isocyanatocyclohexyl) Methane	174
Encapsulation of Crosslinking Reactants	176
Hydrogen Alkylpolysiloxane and Tin Catalyst	176
Polymer Sized Yarns	177
Acrylic Acid Polymer and Oxalic Acid	179
Ethylene Chlorohydrin Pretreatment	180

DIETHYLAMINOETHYLATED COTTON AND OTHER MODIFIED CELLULOSICS	181
Diethylaminoethylated Cotton	181
Epoxide Reaction Products	181
Epichlorohydrin Reactions	182
Reversible Crosslinking of Cellulosic Fabrics	183
Reversible Crosslinks Using Sulfhydryl Substituted Polymer	184
2-Chloroethyl Diethylamine-Cellulose Reaction	184
Acid Salt Form	186
Cellulose Esters	186
Esterification with Sorbic Acid in Presence of Trifluoroacetic Anhydride	186
Esterification with Fatty Acids in Presence of Trifluoroacetic Anhydride	186
General Crosslinking Techniques	187
Epichlorohydrin High Temperature Treatment	187
Vaporous Epichlorohydrin Treatment	188
Ammonium Cyanate and Epichlorohydrin	190
Butadienediepoxide and Mercerizing Treatment	191
Cellulose Acrylates and Nitrate Catalysts	191
Dicyclopentadiene Dicarboxylic Acid	193
Cellulose Dicyclopentadiene Monocarboxylates	195
(Aminoalkyl)Aminochlorodeoxycellulose	197
(Carboxylalkylthio)Chlorodeoxycellulose	199
Carbonyl-Containing Cellulosic Reduced Using Alkali Borohydrides	199
Tris(2-Chloromethyl)Phosphoramidate	201
Halo-Substituted Furan or Thiophene and Pyridine Compound	201
Other Chemically Modified Cellulosics	202
Selective Ethylation	202
Acetylation	203
Sulfonoethylation	205
Sodium N-Methylbis(2-Sulfatoethyl) Amine	205
Sodium Cellulosates and Epoxides	207
Solvent Swelling, Isoprene Impregnation and Polymerization	208
FORMALDEHYDE AND ACETALS	210
Formaldehyde—Vapor Phase Processes	210
Uncatalyzed Process	210
Impregnation with Zinc Chloride	211
Sulfur Dioxide	211
Gaseous Acid Catalyst	211
Delayed Cure Process	213
Urea Impregnation	213
Oxymethylene Polymers	213
Acetals and Other Processes	214
Polyoxymethylene Dialkyl Diether	214
Tetraoxane and Pentaoxane	215
Tetraoxymethylene and Metal-Boron Fluorides	216
Polymeric Acetal from Formaldehyde-Polyol Reaction	217
Polychlorotetrahydrothiophene-1,1-Dioxide	218
SULFONES AND SULFONAMIDES	219
Sulfones	219
2-Hydroxyethyl Vinyl Sulfone	219
2-Vinylsulfonylethanol	220
Bis(β -Hydroxyethyl) Sulfone	221
Polyvinyl Alcohol and Bis(β -Hydroxyethyl) Sulfone	224
β -Oxyethyl Unsymmetrical Sulfones	225
Unsaturated Sulfone Amines	226
Salts of Alkyl Alkoxyalkyl Hydroxyalkyl Sulfonium Sulfates	228
Sodium Salt of Bissulfatoethyl Sulfone	232
Propane Sulfone	235

Activated Vinyl Compounds and in Situ Quaternary Amine Compounds	236
Quaternary Ammonium Salt and Sulfone Residue	238
Sulfonamides.	240
Methylolated Sulfonamides.	240
Polyfunctional Sulfonamides.	242
Cyclic N,N-Substituted Sulfamides	243
RADIATION PROCESSING	245
Aminoplasts—General	245
Blends of Styrene Grafted Fiber and Untreated Fiber.	245
Tung Oil Solutions	246
Acrylic Grafting Followed by Conventional Methylol Resin Crosslinking.	248
Microwave Energy	249
Soiling Resistance	251
In Situ Formation of Synthetic Acid Polymers.	251
Irradiation and Alkaline Treatment of Polyester-Cotton Blends	253
Polyalkylene Glycol Diacrylates	254
Flame Resistance.	255
N,N',N''-Triallyl Phosphoric Triamide and N-Methylolacrylamide.	255
Other Processes	257
N-Methylolacrylamide Treatment of Nylon-Cellulose Blends	257
Grafting onto a Partially Swollen Substrate.	258
Glycidyl Methacrylate.	259
N,N'-(Dihydroxy)Ethylenebisnorbornenes	261
Stabilization by Esterification with Furoyl, Thenoyl or Benzoyl Chlorides.	262
DURABLE PRESS AND FLAME RETARDANT TREATMENTS	265
Phosphorus Compounds	265
Polyvinylphosphine Oxide.	265
Haloalkylphosphine Oxide	267
Methyltrivinylphosphonium Iodide.	268
Tetrakis(Hydroxymethyl)Phosphonium Chloride-Epichlorohydrin.	269
Hydroxyalkylphosphonium Halides	270
Quaternary Vinylphosphonium Compounds.	272
Aminoepoxy Phosphonates.	273
Heterocyclic Phosphorus Compounds	276
N,N',N''-Triallyl Phosphoric Triamide.	278
Polyalkyl Phosphite-Polyamine Reaction Products	279
N-Methylolphosphazene Compounds	280
PART II. POLYESTER BLENDS AND WOOL	
POLYESTER AND COTTON-POLYESTER BLENDS	282
Aminoplast Processing Techniques to Achieve Durable Press	282
Final Annealing.	282
Agitation Procedure Following Treatment	284
Drying Technique	285
Crosslinking Acrylic Polymer and Polyester Resin.	287
Cyclic Glyoxal Acetals	288
Buffered Aldehyde Fixation Composition.	290
Other Processing Techniques to Achieve Durable Press.	292
Vaporizable Phenylphenol Swelling Agent	292
Aminoplast and Polymeric Additives for Durable Press and Soil Prevention	293
Dimethylterephthalate-Glycol Reaction Product.	293
Cellulose Derivative and Low Molecular Weight Polyester Resin	296
Carboxy-Containing Acrylic Polymers.	297
Ethylene-Maleic Anhydride Copolymers.	298
Acid Polymers and Fluorocarbon	298
Fluoroacrylic Polymer and Hydrophilic Acrylic Polymer	301

Water-Soluble, Hydroxy-Terminated Polyurethanes	302
Animal Glue	304
Bath Additives for Durable Press and Soil Prevention	307
Phenylstearic Acid and Carboxy-Containing Polymer	307
Water-Soluble Organic Acid and Surfactant	309
Citric Acid Derivatives	312
Propylene Glycols	313
Oxyalkylated Phosphoric Acid	313
Other Processing Techniques for Durable Press and Soil Prevention	315
Formaldehyde, Steam and Sulfur Dioxide	315
WOOL TREATMENTS	317
Polyurethanes	317
Glycidol-Modified Polyurethanes	317
Polyurethane and Reducing Treatments	320
Polyfunctional Isocyanates and Polymeric Polyhydroxy Compounds	322
Polyurethane Treatments	324
Mercapto-Functional Compositions	326
Thiol-Terminated Polysulfides	326
Thiol-Terminated Polyoxylakylene Resins	329
Mercaptan-Containing Polyurethanes	332
Polythiols Based on Polybutadiene	335
Polysulfhydrylated Polymers	337
Polythiol Esters	338
Mercaptan Polyesters	338
Formaldehyde and Aminoplasts	339
Paraformaldehyde and Cresol	339
Formaldehyde Treatment	340
Annealing at High Temperatures	341
Melamine and Uron Resins	343
Melamine and Dihydroxyimidazolidinone Resins	343
Fibrous Silk Structures	345
Aziridinyl and Acrylic Polymers	345
Polyfunctional Aziridinyl Compounds	347
Other Treatments and Processes	348
Sulfonium and Ammonium Compounds with Alkaline Catalyst	348
Swelling Agent and Bisulfite Reducing Agent	349
Chlorination-Oxidation Treatment	350
Betaine Compounds	350
Copolymers of Isobutylene or Propylene and Acid Chloride Monomers	351
Polyvinyl Chloroacetate-Thiosulfate Products	353
Steam Pressing and Exposure to Unsaturated Steam	356
Solvent Solution Treatment of Shape Stabilized Garments	357
NYLON AND OTHER SYNTHETIC FIBERS	360
Intermittent Fusing of Strands	360
Bulked Nylon Yarn	361
Phosphoric Acid Treatment of Acrylonitrile-Hydroxyethyl Methacrylate Fiber	362
COMPANY INDEX	364
INVENTOR INDEX	366
U.S. PATENT NUMBER INDEX	370