

# CONTENTS

## PART I RAW MATERIALS

<b>ALUMINA (ALUMINUM OXIDE)</b> . . . . .	2
<b>AGIP USA</b> . . . . .	2
Aluminum Oxide (Produced by Samim Abrasivi SpA) . . . . .	2
<b>Alcan Chemicals</b> . . . . .	3
Aluminas C-70 Series . . . . .	3
<b>Allied Mineral Products</b> . . . . .	4
MINRO 70A . . . . .	4
MINRO 87A (High Alumina Refractory Grog) . . . . .	4
MINRO 90A (High Alumina Refractory Grog) . . . . .	5
<b>AluChem</b> . . . . .	6
AC-17 Reactive Alumina . . . . .	6
AC-99 Tabular Alumina . . . . .	6
Composite Data Sheet—Calcined Alumina . . . . .	7
Composite Data Sheet—Hydrated Alumina . . . . .	7
<b>Baikowski International</b> . . . . .	8
Ultra-Pure Ceramic Alumina Powder . . . . .	8
<b>CERALOX</b> . . . . .	9
CERALOX Aluminas—HPA, TPA and SPA . . . . .	9
CERALOX MPA High Purity Alumina . . . . .	9
<b>Cometals</b> . . . . .	11
Aluminum Hydrate ex Venezuela . . . . .	11
Chinese Crude Brown Fused Alumina . . . . .	11
Gas-Fired Calcined Alumina . . . . .	12
Hungarian Calcined Alumina—Type T-1 Alpha R . . . . .	12
<b>Engineered Materials</b> . . . . .	13
Aluminum Oxide—High Calcined . . . . .	13
<b>Exolon-ESK</b> . . . . .	14
EXOLON Fused Aluminum Oxide Refractory Grain . . . . .	14
EXOLON DC Fused Aluminum Oxide Dust Collector Fines . . . . .	14
<b>General Abrasive</b> . . . . .	15
Aluminum Oxide . . . . .	15
<b>ICD Group</b> . . . . .	16
Ultra High Purity Alumina UA-5055 lot-5556 . . . . .	16

Ultra High Purity Alumina UA-5105 lot-0622 . . . . .	16
<b>Industrial Minerals</b> . . . . .	17
Brown Fused Alumina . . . . .	17
Bubble Alumina . . . . .	17
Calcined Alumina . . . . .	18
Low Soda Alumina . . . . .	18
Thermally Reactive Alumina . . . . .	19
White Fused Alumina . . . . .	19
<b>Kaiser Chemicals</b> . . . . .	20
Calcined Alumina C-1 . . . . .	20
Calcined Alumina C-2 . . . . .	20
Calcined Alumina C-3 . . . . .	21
Calcined Alumina C-4 . . . . .	22
Calcined Alumina C-5R . . . . .	22
Calcined Alumina C-11 . . . . .	23
Calcined Alumina C-60 . . . . .	24
Calcined Alumina C-70 . . . . .	25
Calcined Alumina C-75 . . . . .	25
Calcined Alumina C-77 . . . . .	26
Tabular Alumina T-1061—Crushed Sizes . . . . .	27
Tabular Alumina T-1061—Graded Sizes . . . . .	28
Tabular Alumina T-1061—Ground Sizes . . . . .	30
VERSAL Aluminas . . . . .	31
<b>Lonza</b> . . . . .	32
Aluminum Oxide . . . . .	32
<b>Adolph Meller</b> . . . . .	34
EXAL Alumina (Produced by Criceram) . . . . .	34
<b>Norton</b> . . . . .	35
38 Alundum (White Aluminum Oxide) . . . . .	35
Brown Alundum (Brown Aluminum Oxide) . . . . .	35
E163 Bubble Alundum (White Aluminum Oxide) . . . . .	36
DYNABLAST (Brown Aluminum Oxide) . . . . .	36
<b>Particle Processing &amp; Classifying</b> . . . . .	37
Aluminum Oxide—Blasting Grade . . . . .	37
White Aluminum Oxide . . . . .	38
<b>Refractory Minerals</b> . . . . .	39
K-REF G.C. Powder (Produced by Keith Refractories Ltd.) . . . . .	39
K-REF White Fused Alumina (Produced by Keith Refractories Ltd.) . . . . .	39
K-REF High Purity Bonds (Produced by Keith Refractories Ltd.) . . . . .	39
MIC-ROX—Micron Sized Calcined Alumina for Refractories (Produced by Rox Industries, Inc.) . . . . .	40
ROXAL—Refractory Grade Air Floated Alumina (Produced by Rox Industries, Inc.) . . . . .	40
<b>Reynolds Metals</b> . . . . .	41
Alumina Hydrate . . . . .	41
Fusion Grade Alumina . . . . .	41
High Purity Alumina . . . . .	42
<b>Sohio Electro Minerals</b> . . . . .	43
Brown Fused Alumina Refractory Dust Collector Fines . . . . .	43
Brown Fused Alumina Refractory Grain . . . . .	43
Fused, White Alumina Refractory Bubbles . . . . .	43
Refractory Alumina S-2 Dust Collector Fines White . . . . .	44
White Fused Alumina Refractory Grain . . . . .	44
<b>Vista Chemical</b> . . . . .	45
CATAPAL Boehmite Alumina . . . . .	45
CATAPAL G Alumina (Gamma Type) . . . . .	47

<b>ALUMINA CHROME</b> . . . . .	48
<b>Industrial Minerals</b> . . . . .	48
Fused Alumina Chrome (Grade 813) . . . . .	48
<b>ALUMINA ZIRCONIA</b> . . . . .	49
<b>Industrial Minerals</b> . . . . .	49
Alumina Zirconia . . . . .	49
<b>Norton</b> . . . . .	50
Alumina Zirconia MCA 1360 . . . . .	50
Alumina Zirconia NZ Alundum-Coated . . . . .	50
Alumina Zirconia ZF Alundum . . . . .	51
Alumina Zirconia ZS Alundum . . . . .	51
Alumina Zirconia—STONEBLAST . . . . .	51
<b>ALUMINUM NITRIDE</b> . . . . .	52
<b>ICD Group</b> . . . . .	52
Aluminum Nitride Solids . . . . .	52
<b>Hermann C. Starck</b> . . . . .	53
Aluminum Nitride (AlN)—Grade A . . . . .	53
Aluminum Nitride (AlN)—Grade B . . . . .	54
Aluminum Nitride (AlN)—Grade C . . . . .	55
<b>ALUMINUM TITANATE</b> . . . . .	56
<b>Engineered Materials</b> . . . . .	56
Aluminum Titanate K-4971 . . . . .	56
<b>ANDALUSITE</b> . . . . .	57
<b>F&amp;S Alloys and Minerals</b> . . . . .	57
Andalusite . . . . .	57
<b>Industrial Minerals</b> . . . . .	57
Andalusite—"Purusite" Grade . . . . .	57
<b>Piedmont Minerals</b> . . . . .	58
Andalusite/Pyrophyllite . . . . .	58
<b>ANTIMONY COMPOUNDS</b> . . . . .	60
<b>Asarco</b> . . . . .	60
Asarco Antimony Oxide . . . . .	60
<b>EM Industries</b> . . . . .	60
Antimony(III) Oxide SELECTIPUR . . . . .	60
<b>M&amp;T Chemicals</b> . . . . .	61
M&T Antimony Oxide (Antimony Trioxide, $Sb_2O_3$ ) . . . . .	61
M&T Sodium Antimonate—Free Flowing Grade . . . . .	62
M&T Sodium Antimonate—Regular Grade . . . . .	63
<b>McGean-Rohco</b> . . . . .	64
Antimony Chemicals . . . . .	64
<b>BALL CLAYS</b> . . . . .	65
<b>Cyprus Industrial Minerals, Clay Division</b> . . . . .	65
Tennessee Ball Clays . . . . .	65
<b>E.C.C. America</b> . . . . .	66
Texas Ball Clay . . . . .	66
<b>Hammill &amp; Gillespie</b> . . . . .	67
Ball Clays for the Ceramic Industry (Produced by ECC International) . . . . .	67
<b>Kentucky-Tennessee Clay</b> . . . . .	70
Ball Clay—Typical Properties . . . . .	70
<b>Old Hickory Clay</b> . . . . .	72
Kentucky Clays . . . . .	72

Tennessee Clays . . . . .	73
<b>H.C. Spinks Clay . . . . .</b>	<b>74</b>
Chemical Analyses of Spinks Clays . . . . .	74
Properties of Bandy Black Clay . . . . .	75
Properties of Bandy Tan Clay . . . . .	76
Properties of Black Charm Clay . . . . .	77
Properties of ½ Champion-½ Challenger Clay . . . . .	78
Properties of Coppen Light Clay . . . . .	79
Properties of Foundry Hill Creme Clay . . . . .	80
Properties of Gleason Clay . . . . .	81
Properties of Hays Special Clay . . . . .	82
Properties of Spinks C-B Clay . . . . .	83
Properties of Spinks CP #7 Clay . . . . .	84
Properties of Spinks HC #5 Clay . . . . .	85
Properties of Spinks Special Clay . . . . .	86
Properties of Spinks 3-C Clay . . . . .	87
Properties of Spinks Blend Clay . . . . .	88
Spinks C & C Clay . . . . .	89
Spinks Jones Mill Light Clay . . . . .	89
<b>BARIUM COMPOUNDS . . . . .</b>	<b>90</b>
<b>Cometals . . . . .</b>	<b>90</b>
Barium Carbonate—Free Flowing Powder . . . . .	90
Barium Carbonate—Granular (Calcined) . . . . .	90
Barium Nitrate Crystals . . . . .	91
Chinese Lump Pigment Grade Baryte in Bulk . . . . .	91
<b>Ferro, Transelco Division . . . . .</b>	<b>92</b>
Barium Stannate—Code 319 . . . . .	92
Barium Titanate—Code 219-N . . . . .	92
Barium Titanate—Code 219-1 . . . . .	93
Barium Titanate—Code 219-3 . . . . .	93
Barium Titanate—Code 219-4 . . . . .	94
Barium Titanate—Code 219-5 . . . . .	94
Barium Titanate—Code 219-6 . . . . .	95
Barium Zirconate—Code 119 . . . . .	95
<b>Kali-Chemie . . . . .</b>	<b>96</b>
Barium Carbonate . . . . .	96
<b>Tam Ceramics . . . . .</b>	<b>98</b>
TICON Barium Titanates . . . . .	98
TICON C . . . . .	99
TICON P . . . . .	99
TICON T . . . . .	100
TICON TA . . . . .	100
TICON CN . . . . .	101
TICON COF (40, 50, 60 & 70) . . . . .	101
TICON 5016 and TICON 5018 . . . . .	102
TICON HPB . . . . .	103
<b>BAUXITE . . . . .</b>	<b>104</b>
<b>Allied Mineral Products . . . . .</b>	<b>104</b>
MINRO 88A (RASC Bauxite) . . . . .	104
<b>AluChem . . . . .</b>	<b>105</b>
Refractory Grade Bauxite . . . . .	105
<b>American Minerals . . . . .</b>	<b>105</b>
Bauxite . . . . .	105
<b>C-E Minerals . . . . .</b>	<b>106</b>
Calcined Bauxite—Refractory Grade . . . . .	106

<b>Cometals</b> . . . . .	107
Chinese Calcined Refractory Grade Bauxite Powder . . . . .	107
Chinese Calcined Welding Grade Bauxite . . . . .	107
Chinese Henan Abrasive Grade Bauxite . . . . .	108
Chinese Raw Refractory Grade Bauxite (Uncalcined) . . . . .	108
Chinese Rotary Kiln Calcined Refractory Bauxite . . . . .	109
Chinese Shaft Kiln Calcined Refractory Bauxite . . . . .	109
Chinese Shanxi Abrasive Grade Bauxite . . . . .	110
Chinese Super Calcined Refractory Bauxite (SSK) . . . . .	110
<b>F &amp; S Alloys and Minerals</b> . . . . .	111
Bauxite, Calcined—People's Republic of China—Refractory Grade C80 . . . . .	111
Bauxite, Calcined—People's Republic of China—Refractory Grade C85 . . . . .	111
<b>A.P. Green Refractories</b> . . . . .	112
Calcined Alabama Bauxite . . . . .	112
<b>ICD Group</b> . . . . .	112
Chinese Calcined Bauxites . . . . .	112
<b>Philipp Brothers</b> . . . . .	113
Super Calcined Refractory Bauxite (RASC Grade) (Produced by Guyana Mining Enterprise Limited) . . . . .	113
<b>BERYLLIUM OXIDE</b> . . . . .	114
<b>Brush Wellman</b> . . . . .	114
GC-HF Beryllium Oxide Powder . . . . .	114
UOX Beryllium Oxide Powder . . . . .	115
<b>BISMUTH COMPOUNDS</b> . . . . .	116
<b>EM Industries</b> . . . . .	116
Bismuth (III) Oxide SELECTIPUR . . . . .	116
<b>Ferro, Transelco Division</b> . . . . .	116
Bismuth Stannate ( $\text{Bi}_2\text{O}_3 \cdot 3\text{SnO}_2$ ) . . . . .	116
Bismuth Titanate ( $\text{Bi}_2\text{O}_3 \cdot 2\text{TiO}_2$ ) . . . . .	116
Bismuth Trioxide ( $\text{Bi}_2\text{O}_3$ ) . . . . .	117
Bismuth Zirconate ( $2\text{Bi}_2\text{O}_3 \cdot 3\text{ZrO}_2$ ) . . . . .	117
<b>BONE ASH</b> . . . . .	118
<b>Hammill &amp; Gillespie, Inc.</b> . . . . .	118
Best Waterground Ceramic Bone Ash . . . . .	118
<b>BORATES</b> . . . . .	119
<b>Hammill &amp; Gillespie</b> . . . . .	119
Gerstley Borate . . . . .	119
<b>United States Borax &amp; Chemical</b> . . . . .	120
Zinc Borate—FIREBRAKE ZB . . . . .	120
<b>BORAX</b> . . . . .	121
<b>Cometals</b> . . . . .	121
ETIBOR 46 (5 Mole Borax) . . . . .	121
<b>United States Borax &amp; Chemical</b> . . . . .	121
Anhydrous Borax—Granular . . . . .	121
Borax 5 Mol (Sodium Tetraborate Pentahydrate)—Granular and Powdered . . . . .	122
Borax Glass . . . . .	123
<b>BORIC ACID</b> . . . . .	124
<b>AGIP USA</b> . . . . .	124
Boric Acid (Produced by Società Chimica Larderello SpA) . . . . .	124
<b>American Borate</b> . . . . .	125
Turkish Boric Acid . . . . .	125

Cometals . . . . .	125
Turkish Boric Acid . . . . .	125
United States Borax & Chemical . . . . .	126
Anhydrous Boric Acid H.P. (B <sub>2</sub> O <sub>3</sub> )—4 and 60-Mesh . . . . .	126
Boric Acid—Granular and Powdered (Technical, N.F. and Specialty Quality Grades) . . . . .	127
<b>BORON</b> . . . . .	129
<b>Hermann C. Starck</b> . . . . .	129
Amorphous Boron—Grade 1 . . . . .	129
Amorphous Boron—Grade 2 . . . . .	129
Amorphous Boron—Grade 3 . . . . .	130
Crystalline Boron—Grade 99.5% Boron . . . . .	131
Crystalline Boron—Grade 98/99% Boron . . . . .	131
<b>BORON CARBIDE</b> . . . . .	132
<b>Advanced Refractory Technologies</b> . . . . .	132
Boron Carbide—Abrasive Grade . . . . .	132
Boron Carbide—Nuclear Grade . . . . .	132
Boron Carbide—Pellets . . . . .	132
<b>Cometals</b> . . . . .	133
Chinese Boron Carbide Powder . . . . .	133
<b>Norton</b> . . . . .	133
NORBIDE (Boron Carbide) . . . . .	133
<b>BORON NITRIDE</b> . . . . .	134
<b>ICD Group</b> . . . . .	134
Boron Nitride Powder . . . . .	134
Boron Nitride Solids . . . . .	135
<b>Hermann C. Starck</b> . . . . .	136
Boron Nitride—Grade A 01 . . . . .	136
Boron Nitride—Grade A 05 . . . . .	136
Boron Nitride—Grade B 50 . . . . .	137
<b>Union Carbide</b> . . . . .	138
UCAR Boron Nitride Powders . . . . .	138
<b>CALCIUM COMPOUNDS</b> . . . . .	139
<b>Ferro, Transelco Division</b> . . . . .	139
Calcium Stannate—Code 317 . . . . .	139
Calcium Titanate—Code 217 . . . . .	139
Calcium Zirconate—Code 117 . . . . .	140
<b>Georgia Marble</b> . . . . .	140
Calcium Carbonate . . . . .	140
<b>CARBON (See also GRAPHITE)</b> . . . . .	143
<b>Airco Carbon</b> . . . . .	143
Airco Granular Products . . . . .	143
<b>Asbury Graphite Mills</b> . . . . .	145
Anthracite Coal—AC Carbon #2 . . . . .	145
Anthracite—Standard Filler . . . . .	145
Calcined Anthracite Grade No. 7001 . . . . .	146
Ground Calcined Anthracite Grade No. 7002 . . . . .	146
Calcined Petroleum Coke Grade No. 4163 . . . . .	146
Calcined Petroleum Coke Grade No. 4350 . . . . .	147
Coke (Breeze) Grade No. 4038 . . . . .	147
<b>J.S. McCormick</b> . . . . .	148
Industrial Carbons . . . . .	148

<b>CELESTITE</b> . . . . .	149
<b>Cometals</b> . . . . .	149
Celestite . . . . .	149
<b>Industrial Minerals</b> . . . . .	149
Celestite—Code 5701 . . . . .	149
<b>CHLORITE MINERAL</b> . . . . .	150
<b>Cyprus Industrial Minerals, Talc Division</b> . . . . .	150
SIERRALITE II . . . . .	150
<b>CHROME ORE</b> . . . . .	151
<b>F &amp; S Alloys and Minerals</b> . . . . .	151
Chrome Ore, Refractory—Palauig, Philippines—Grade “Fine Lumps” . . . . .	151
Chrome Ore, Refractory—Palauig, Philippines—Grades “Minus 10 Mesh A and B” . . . . .	151
Chrome Ore, Refractory—Palauig, Philippines—Grade “Plus 10 Mesh” . . . . .	151
Chrome Ore, Refractory—Turkey . . . . .	152
Chrome Ore, Refractory—Winterweld Henry Gould and Millsell Chrome Mines, Transvaal, Republic of South Africa—Grades W.R.G.V. and W.R.G.X. . . . .	152
<b>CHROMIUM OXIDE</b> . . . . .	153
<b>Advanced Refractory Technologies</b> . . . . .	153
Chrome Oxide CR-99 . . . . .	153
<b>American Chrome &amp; Chemicals</b> . . . . .	153
ACCROX C . . . . .	153
ACCROX R . . . . .	154
ACCROX S . . . . .	154
<b>Cometals</b> . . . . .	155
Green Chrome Oxide . . . . .	155
<b>EM Industries</b> . . . . .	155
Chrome (III) Oxide SELECTIPUR . . . . .	155
<b>Industrial Minerals</b> . . . . .	155
Chromic Oxide—Code 5601 . . . . .	155
<b>CLAYS (MISCELLANEOUS)</b> . . . . .	156
<b>Cedar Heights Clay</b> . . . . .	156
Air Floated Ceramic Cream (Goldart) . . . . .	156
Cedar Heights Redart Clay . . . . .	156
Ceramic Goldart . . . . .	157
<b>Colorado Refractories</b> . . . . .	157
Cherokee Plastic Clay . . . . .	157
<b>A.P. Green Refractories</b> . . . . .	158
Missouri High Alumina Clay (Crude or Calcined) . . . . .	158
Missouri Plastic Clay . . . . .	158
<b>Hammill &amp; Gillespie</b> . . . . .	159
Blackbird Clay (Also known as “Barnard”) . . . . .	159
“True Albany” Slip Clay (Produced by Industrial Mineral Products, Inc.) . . . . .	159
<b>Missouri Minerals</b> . . . . .	160
Calcined Burley . . . . .	160
Calcined Diaspore . . . . .	160
Hawthorne Bond . . . . .	160
<b>Morie</b> . . . . .	161
GOFF AMMO . . . . .	161
GOFF TORPEDO . . . . .	161
MEX-A-LINE . . . . .	161
Shredded or Crude Clay . . . . .	162
T-90 . . . . .	162
<b>Westwood Ceramic Supply</b> . . . . .	163

Raw Clays . . . . .	163
<b>COBALT COMPOUNDS</b> . . . . .	164
<b>Engineered Materials</b> . . . . .	164
Cobalt Aluminate—Technical Grade . . . . .	164
Cobalt Oxide—Hi-Purity (Produced by Mason Color & Chemical Works, Inc.) . . . . .	164
Cobalt Oxide—Pure (Produced by Mason Color & Chemical Works, Inc.) . . . . .	165
Cobalt Oxide—Very Pure (Produced by Mason Color & Chemical Works, Inc.) . . . . .	165
Cobalt Silicate—Technical Grade . . . . .	166
<b>Hall Chemical</b> . . . . .	166
Cobalt Carbonate—Pure . . . . .	166
Cobalt Oxide . . . . .	167
Cobalt Oxide X 71½ . . . . .	167
Cobalt Oxide—"V" Grade . . . . .	168
<b>COLEMANITE</b> . . . . .	169
<b>American Borate</b> . . . . .	169
Turkish Colemanite—Textile Fiberglass Grade . . . . .	169
<b>Cometals</b> . . . . .	170
Turkish Bigadic Washed Colemanite . . . . .	170
Turkish Kestelek Unwashed Colemanite . . . . .	170
<b>F &amp; S Alloys and Minerals</b> . . . . .	170
Colemanite . . . . .	170
<b>COPPER AND COPPER OXIDE</b> . . . . .	171
<b>American Chemet</b> . . . . .	171
Copper Granules . . . . .	171
Copper Powder (Proposed Specification) . . . . .	171
Cupric Oxide 13600 . . . . .	172
Cupric Oxide UP 13600 . . . . .	172
Lo Lo Tint 97 . . . . .	173
Purple Copp 97N . . . . .	174
Red Copp 97N—Premium Grade . . . . .	175
Red Copper Oxide 95 . . . . .	175
<b>CORDIERITE</b> . . . . .	176
<b>Engineered Materials</b> . . . . .	176
Cordierite Seed . . . . .	176
<b>Industrial Minerals</b> . . . . .	176
Cordierite . . . . .	176
<b>Muscle Shoals Minerals</b> . . . . .	177
Cordierite—Grade 17MAS . . . . .	177
<b>CORUNDUM</b> . . . . .	178
<b>AGIP USA</b> . . . . .	178
ITALCOR Bianco Corundum (Produced by Samim Abrasivi SpA) . . . . .	178
ITALCOR Bianco P Corundum (Produced by Samim Abrasivi SpA) . . . . .	178
ITALCOR Bianco/REF Corundum (Produced by Samim Abrasivi SpA) . . . . .	179
ITALCOR COR F Corundum (Produced by Samim Abrasivi SpA) . . . . .	179
ITALCOR CSF Corundum (Produced by Samim Abrasivi SpA) . . . . .	180
ITALCOR CSFC Corundum (Produced by Samim Abrasivi SpA) . . . . .	180
ITALCOR CSF P Corundum (Produced by Samim Abrasivi SpA) . . . . .	181
ITALCOR CSFPC Corundum (Produced by Samim Abrasivi SpA) . . . . .	181
ITALCOR RAC Corundum (Produced by Samim Abrasivi SpA) . . . . .	182
ITALCOR RB Corundum (Produced by Samim Abrasivi SpA) . . . . .	182
ITALCOR RBC Corundum (Produced by Samim Abrasivi SpA) . . . . .	183
ITALCOR RB/REF Corundum (Produced by Samim Abrasivi SpA) . . . . .	183

ITALCOR RBS Corundum (Produced by Samim Abrasivi SpA) . . . . .	184
ITALCOR RBT7 Corundum (Produced by Samim Abrasivi SpA) . . . . .	184
ITALCOR RBT7 P Corundum (Produced by Samim Abrasivi SpA). . . . .	185
ITALCOR Rosa Corundum (Produced by Samim Abrasivi SpA). . . . .	185
<b>General Abrasive</b> . . . . .	186
Corundum Powders . . . . .	186
<b>DIATOMACEOUS EARTH</b> . . . . .	187
<b>Eagle-Picher Industries</b> . . . . .	187
CELATOM MN-4 . . . . .	187
CELATOM MN-51. . . . .	187
CELATOM MW-25 . . . . .	188
<b>DOLOMITE</b> . . . . .	189
<b>National Lime &amp; Stone</b> . . . . .	189
Typical Analyses for #10, #12 and #20 Dried Dolomite . . . . .	189
Typical Analysis for Pulverized Dolomitic Quicklime . . . . .	189
<b>National Refractories</b> . . . . .	190
Calcined Dolomite (Fiberglass Grade) . . . . .	190
DSF-AF Dolomite . . . . .	190
Fine Dolomite Fillers . . . . .	191
Glass Grade Dolomite . . . . .	192
Pulverized Quicklime (Calcined Dolomite) . . . . .	192
<b>FELDSPAR</b> . . . . .	193
<b>Engineered Materials</b> . . . . .	193
Potash Feldspar . . . . .	193
<b>Indusmin</b> . . . . .	193
MINSILSPAR . . . . .	193
MINSPAR 4/MINSPAR 3 . . . . .	194
MINSPAR 170 . . . . .	195
MINSPAR 200 . . . . .	195
<b>International Minerals &amp; Chemical</b> . . . . .	196
F-1 Feldspar . . . . .	196
F-4 Feldspar 200 Mesh . . . . .	196
<b>KMG Minerals</b> . . . . .	197
K-200 Ceramic Grade High Potash Feldspar . . . . .	197
<b>Pacer</b> . . . . .	197
Custer Potash Feldspar . . . . .	197
<b>Spartan Minerals</b> . . . . .	198
LITHOSPAR . . . . .	198
LITHOSPAR (Container Glass Grade) . . . . .	198
LITHOSPAR (Glass Grade) . . . . .	199
LITHOSPAR (Pulverized Ceramic Grade). . . . .	200
<b>Steelhead Resources</b> . . . . .	201
CALSPAR-K . . . . .	201
CALSPAR-N . . . . .	201
<b>FERRITES</b> . . . . .	202
<b>Advanced Ceramic Technologies</b> . . . . .	202
3H7 Ferrite Material . . . . .	202
4R6L Ferrite Material . . . . .	203
<b>Hoosier Magnetics</b> . . . . .	204
Ferrite Powders for Ceramic Magnets . . . . .	204
<b>ICD Group</b> . . . . .	205
Anisotropic Calcined Powders . . . . .	205

<b>Stackpole</b> . . . . .	206
CERAMAG Soft Ferrites . . . . .	206
Power Cores—CERAMAG 24B . . . . .	207
<b>FIRECLAY</b> . . . . .	208
<b>Donoho Clay</b> . . . . .	208
MELTZONA BLASTPATCH 516 . . . . .	208
MELTZONA MILLED CLAY . . . . .	208
<b>Missouri Minerals</b> . . . . .	209
Crude Plastic Fireclay . . . . .	209
<b>FLINT CLAY</b> . . . . .	210
<b>Colorado Refractories</b> . . . . .	210
SILOAM Flint Clay . . . . .	210
<b>Cometals</b> . . . . .	211
Calcined Flint Clay . . . . .	211
<b>A.P. Green Refractories</b> . . . . .	212
Crude 1st Grade Missouri Flint Clay . . . . .	212
Crude Slightly Alkali Missouri Flint Clay . . . . .	212
Crude Slightly Irony Missouri Flint Clay . . . . .	213
<b>Missouri Minerals</b> . . . . .	213
Missouri Flint Clay—Calcined . . . . .	213
<b>FLUORSPAR</b> . . . . .	214
<b>Cometals</b> . . . . .	214
Acid Grade Fluorspar . . . . .	214
<b>Ozark-Mahoning</b> . . . . .	215
Fluorspar, Dry Acid Grade—Fluorite (Calcium Fluoride) . . . . .	215
Fluorspar, WR/Coarse Grade—Fluorite (Calcium Fluoride) . . . . .	215
<b>Seaforth Mineral &amp; Ore</b> . . . . .	216
Fluorspar . . . . .	216
Fluorspar—Acid/Ceramic . . . . .	216
<b>FLUXES</b> . . . . .	217
<b>Bassichis</b> . . . . .	217
Ceramic Body Flux . . . . .	217
<b>Chemetals</b> . . . . .	219
Manganese Dioxide C . . . . .	219
Manganese Dioxide HP . . . . .	219
Manganous Oxide HP—Grade II . . . . .	220
Manganous Oxide HPX . . . . .	220
<b>Engineered Materials</b> . . . . .	221
GEM-3983 Alkaline Calcine Flux (Produced by Mason Color and Chemical Works) . . . . .	221
<b>FRITS</b> . . . . .	222
<b>Coatings Technology</b> . . . . .	222
Porcelain Enamel Frits . . . . .	222
<b>General Color &amp; Chemical</b> . . . . .	223
Lead-Bearing Frits . . . . .	223
Special Frits with Lead . . . . .	224
Leadless Frits . . . . .	225
<b>O. Hommel</b> . . . . .	227
Lead-Bearing Frits—Standard . . . . .	227
Lead-Bearing Frits—Special . . . . .	227
Leadless Frits—Standard . . . . .	228
Leadless Frits—Special . . . . .	229

<b>Mobay Chemical</b> . . . . .	230
PEMCO Leadless Glaze Frits . . . . .	230
PEMCO Lead-Bearing Glaze Frits . . . . .	233
<b>GARNET</b> . . . . .	236
<b>Countis</b> . . . . .	236
Aluminum Substituted Garnets . . . . .	236
Gadolinium Substituted Garnets . . . . .	238
Gadolinium-Aluminum Substituted Garnets . . . . .	239
Pure and Zirconium Substituted Garnets . . . . .	240
Garnet Type CG-1950 . . . . .	241
<b>GRAPHITE (See also CARBON)</b> . . . . .	242
<b>Asbury Graphite Mills</b> . . . . .	242
Artificial Graphite Grade No. 4015 . . . . .	242
Artificial Graphite Grade No. 4421 . . . . .	242
Crystalline Vein Graphite Grade No. 2040 . . . . .	243
Flake Graphite Grade No. 230-S . . . . .	243
Flake Graphite Grade No. 3061 . . . . .	244
Natural Amorphous Graphite Grade No. 9D8 . . . . .	244
Natural Amorphous Graphite Grade No. 505 . . . . .	244
Natural Fissure Vein Graphite Grade No. 280-H . . . . .	245
Synthetic Graphite Grade No. 4443 . . . . .	245
<b>Cometals</b> . . . . .	246
Natural Amorphous Graphite . . . . .	246
Natural Crystalline Flake Graphite . . . . .	246
<b>Dixon Ticonderoga</b> . . . . .	247
Amorphous Graphite Grade No. 1310 . . . . .	247
Large Flake Graphite Grade No. 1302 . . . . .	247
Low Cost Graphite Fines Grade No. 1313 . . . . .	247
Medium Flake Graphite Grade No. 1287 . . . . .	247
<b>F &amp; S Alloys and Minerals</b> . . . . .	248
Graphite, Natural Amorphous—South Korea . . . . .	248
Graphite, Natural Crystalline Flake—S.M.G.I. Madagascar Graphite (Fine and Extra-Fine Flakes) . . . . .	248
Graphite, Natural Crystalline Flake—S.M.G.I. Madagascar Graphite (Large and Medium Flakes) . . . . .	249
<b>Industrial Minerals</b> . . . . .	249
Graphite Flake—Code No. 5000 . . . . .	249
<b>Superior Graphite</b> . . . . .	250
High Purity Crystalline Flake Graphite 2900 Series . . . . .	250
High Purity Crystalline Graphite 4900 Series . . . . .	250
Spherical Graphitic Carbon 9400 Series . . . . .	251
<b>IRON OXIDE</b> . . . . .	252
<b>F &amp; S Alloys and Minerals</b> . . . . .	252
Black Iron Oxide—Grade BLACKIOX 70 and BLACKIOX FINES . . . . .	252
Red Iron Oxide—Grade REDIOX and REDIOX FINES . . . . .	252
<b>Hammill &amp; Gillespie</b> . . . . .	253
“P” Spanish Red Oxide . . . . .	253
<b>KAOLIN (CHINA CLAY)</b> . . . . .	254
<b>Albion Kaolin</b> . . . . .	254
Albion Crushed Bond . . . . .	254
Albion Crushed Form . . . . .	255
Albion Crushed Spere . . . . .	256
Albion Pulverized Bond 300 . . . . .	257

Albion Pulverized Form 300 . . . . .	258
Albion Pulverized Sperse 300. . . . .	259
Albion Slurry Sperse . . . . .	260
<b>Cyprus Industrial Minerals, Clay Division</b> . . . . .	261
Ceramic Grade Kaolins . . . . .	261
<b>Edgar Minerals</b> . . . . .	262
CRYSTALEX Georgia Kaolin . . . . .	262
<b>Engelhard</b> . . . . .	263
Engelhard Specialty Aluminum Silicates . . . . .	263
<b>Feldspar</b> . . . . .	265
EPK-Kaolin . . . . .	265
<b>Georgia Kaolin</b> . . . . .	266
Kaolin for Porcelain Artware Bodies . . . . .	266
PIONEER Airfloated Kaolin . . . . .	266
6 TILE Airfloated Kaolin . . . . .	267
VELVACAST Kaolin . . . . .	267
<b>A.P. Green Refractories</b> . . . . .	267
Calcined Arkansas Kaolin . . . . .	267
<b>Hammill &amp; Gillespie</b> . . . . .	268
China Clays for the Ceramic Industry (Produced by ECC International). . . . .	268
<b>J.M. Huber</b> . . . . .	270
Kaolin Clays for Ceramics . . . . .	270
<b>KMG Minerals</b> . . . . .	272
Kings Mountain Clay . . . . .	272
<b>U.S. Silica</b> . . . . .	273
SNOW*TEX Calcined Aluminum Silicate. . . . .	273
<b>R.T. Vanderbilt</b> . . . . .	274
PEERLESS Kaolin. . . . .	274
<b>Wilkinson Minerals</b> . . . . .	275
WILKLAY CR . . . . .	275
WILKLAY WC . . . . .	275
<b>KYANITE</b> . . . . .	276
<b>Kyanite Mining</b> . . . . .	276
Virginia Kyanite and Mullite . . . . .	276
<b>LANTHANIDE COMPOUNDS</b> . . . . .	278
<b>Molycorp</b> . . . . .	278
Bastnasite Concentrates . . . . .	278
Cerium Carbonate . . . . .	279
Cerium Concentrate . . . . .	279
Cerium Fluoride (Technical Grade) . . . . .	280
Cerium Nitrate . . . . .	280
Cerium Oxide . . . . .	281
Europium Oxide . . . . .	282
Gadolinium Oxide . . . . .	282
Lanthanide Chloride (Rare Earth Chloride) . . . . .	283
Lanthanum Concentrate . . . . .	284
Lanthanum-LN Carbonate . . . . .	284
Lanthanum-LN Chloride . . . . .	285
Lanthanum-LN Nitrate . . . . .	285
Neodymium Carbonate . . . . .	286
Neodymium Oxide . . . . .	286
Praseodymium Oxide . . . . .	287
Samarium Oxide . . . . .	288
Yttrium Oxide . . . . .	289
<b>Rhone-Poulenc</b> . . . . .	290
Cerium Compounds . . . . .	290

Erbium Compounds . . . . .	293
Europium Compounds . . . . .	294
Gadolinium Compounds . . . . .	295
Lanthanum Compounds . . . . .	297
Neodymium Compounds . . . . .	299
Praseodymium Compounds . . . . .	300
Samarium Compounds . . . . .	302
Terbium Compounds . . . . .	303
Thorium Compounds . . . . .	304
Yttrium Compounds . . . . .	305
<b>Trans-Tech</b> . . . . .	308
Lanthanide Chromites and Ferrites . . . . .	308
<b>LEAD COMPOUNDS</b> . . . . .	309
<b>Hammond Lead Products</b> . . . . .	309
Lead Compounds . . . . .	309
<b>LIME</b> . . . . .	310
<b>Corson Lime</b> . . . . .	310
Corson's Hydrated Lime—High Magnesium . . . . .	310
Miracle Lime . . . . .	310
Whitemarsh Special Ground Quicklime . . . . .	311
Whitemarsh Special No. 8 . . . . .	311
<b>LIMESTONE</b> . . . . .	312
<b>Corson Lime</b> . . . . .	312
Corson Dolomitic Limestone . . . . .	312
Corson's 200 Mesh Pulverized Limestone . . . . .	312
<b>Pfizer</b> . . . . .	313
DOLOCRON Pulverized Dolomitic Limestone . . . . .	313
DOLOFIL Pulverized Dolomitic Limestone . . . . .	314
<b>Stetley Resources</b> . . . . .	315
STONELITE Pulverized Dolomitic Limestone . . . . .	315
<b>LITHIUM COMPOUNDS</b> . . . . .	316
<b>Foote Mineral</b> . . . . .	316
Lithium Carbonate—High Purity . . . . .	316
Lithium Carbonate—Technical Grade . . . . .	316
<b>Lithium Corporation of America</b> . . . . .	317
Lithium Aluminate . . . . .	317
Lithium Carbonate—Technical Grade . . . . .	317
Lithium Fluoride . . . . .	318
Lithium Manganate . . . . .	319
Lithium Metasilicate, Standard . . . . .	320
Lithium Molybdate . . . . .	320
Lithium Orthosilicate . . . . .	321
Lithium Tetraborate . . . . .	321
Lithium Titanate . . . . .	322
Lithium Zirconate . . . . .	322
<b>MAGNESIA (MAGNESIUM OXIDE)</b> . . . . .	323
<b>AluChem</b> . . . . .	323
High Purity Dead Burned Magnesium Oxide . . . . .	323
<b>American Minerals</b> . . . . .	323
Magnesium Oxide AM Grade—AM92 (Made from NK) . . . . .	323
<b>Baikowski International</b> . . . . .	324
BAIKALOX High Purity Magnesium Oxide . . . . .	324

<b>C-E Minerals</b> . . . . .	325
Fused Magnesium Oxide—Refractory Grade . . . . .	325
TECO-MAG 120S Electrically Insulating Powder . . . . .	325
TECO-MAG 126 Electrically Insulating Powder . . . . .	326
TECO-MAG 130 Electrically Insulating Powder . . . . .	326
TECO-MAG 131 Electrically Insulating Powder . . . . .	327
TECO-MAG 220 Electrically Insulating Powder . . . . .	327
TECO-MAG 240 Electrically Insulating Powder . . . . .	328
TECO-MAG TH Electrically Insulating Powder . . . . .	328
TECO-MAG TL Electrically Insulating Powder . . . . .	329
TECO-MAG TM Electrically Insulating Powder . . . . .	329
<b>Cometals</b> . . . . .	330
Chinese Caustic Calcined Magnesia . . . . .	330
Fused Magnesia . . . . .	330
<b>ICD Group</b> . . . . .	331
Calcined Magnesium Oxide—Standard Industrial Grade . . . . .	331
<b>Industrial Minerals</b> . . . . .	332
Fused Magnesia E1 . . . . .	332
Fused Magnesia Grades M1, M2, M3 and M4 . . . . .	332
Fused Magnesia-Chrome Grade F-10 . . . . .	333
<b>Martin Marietta</b> . . . . .	334
MAGCHEM 10 Technical Grade Magnesium Oxide . . . . .	334
MAGCHEM 30 Technical Grade Magnesium Oxide . . . . .	334
<b>Muscle Shoals Minerals</b> . . . . .	335
Magnesium Oxide Grade 95M . . . . .	335
Magnesium Oxide Grade 98M2 . . . . .	335
<b>National Magnesia Chemicals</b> . . . . .	336
Magnesium Oxide Grade 00 . . . . .	336
Magnesium Oxide Grade 00HB . . . . .	337
Magnesium Oxide Grade 10 . . . . .	338
Magnesium Oxide Grade 20 . . . . .	339
Magnesium Oxide Grade 20 (Special) . . . . .	340
Magnesium Oxide Grade 30 . . . . .	341
Magnesium Oxide Grade 30 (Special) . . . . .	342
Magnesium Oxide Grade 40 . . . . .	343
<b>MAGNESITE</b> . . . . .	344
<b>American Minerals</b> . . . . .	344
Dead-Burned Magnesite Grade AM 96 . . . . .	344
<b>Cometals</b> . . . . .	344
Chinese Dead Burned Magnesite—Grade I . . . . .	344
Chinese Dead Burned Magnesite—Grade II . . . . .	345
Chinese Dead Burned Magnesite—Grade III . . . . .	345
Chinese Fused Magnesite . . . . .	346
Sea Water Magnesite . . . . .	346
<b>F &amp; S Alloys and Minerals</b> . . . . .	347
Magnesite, Calcined—People’s Republic of China—Refractory Grade 85100 . . . . .	347
Magnesite, Dead-Burned—People’s Republic of China—Refractory Grade 9010 . . . . .	347
Magnesite, Dead-Burned—People’s Republic of China—Refractory Grade 9090 . . . . .	347
Magnesite, Dead-Burned—People’s Republic of China—Refractory Grade 9560 . . . . .	347
Magnesite, Dead-Burned—Turkey—Refractory Grades I and II . . . . .	348
Magnesite, Dead-Burned—Turkey—Refractory Grades III and IV . . . . .	348
<b>ICD Group</b> . . . . .	349
Ground Natural Caustic Calcined Magnesite “PEXU” . . . . .	349
<b>MANGANESE COMPOUNDS</b> . . . . .	350
<b>American Minerals</b> . . . . .	350
IMINORE 3 Manganese Dioxide . . . . .	350

<b>EM Industries</b> . . . . .	350
Manganese (II) Carbonate Hydrate SELECTIPUR . . . . .	350
<b>Hall Chemical</b> . . . . .	350
Manganese Nitrate—Electronic Grade . . . . .	350
<b>MICA</b> . . . . .	351
<b>Franklin Mineral Products</b> . . . . .	351
ALSIBRONZ—Water Ground Mica . . . . .	351
Micromesh #3 Water Ground Muscovite Mica . . . . .	352
<b>KMG Minerals</b> . . . . .	353
Dry Ground Muscovite Mica . . . . .	353
White Wet Ground Muscovite Mica . . . . .	353
<b>Mykroy/Mycalex</b> . . . . .	354
Fluorophlogopite Synthetic Mica . . . . .	354
MYKROY/MYCALEX Glass-Bonded Mica . . . . .	354
<b>MULLITE</b> . . . . .	356
<b>Baikowski International</b> . . . . .	356
BAIKALOX High Purity Mullite . . . . .	356
<b>C-E Minerals</b> . . . . .	356
MULCOA Calcines . . . . .	356
MULCOA-47 Light Weight . . . . .	357
MULGRAIN Grains and Flours . . . . .	358
<b>Cometals</b> . . . . .	359
Fused Mullite . . . . .	359
KAOMUL (Sintered Kaolin Mullite 50% Al <sub>2</sub> O <sub>3</sub> ) . . . . .	359
MULLITE SM 70 (Sintered Mullite 70% Al <sub>2</sub> O <sub>3</sub> ) . . . . .	360
<b>Hammill &amp; Gillespie</b> . . . . .	361
MOLOCHITE (Produced by ECC International) . . . . .	361
<b>Industrial Minerals</b> . . . . .	362
Fused Mullite . . . . .	362
Zirconia Mullite . . . . .	362
<b>Refractory Minerals</b> . . . . .	363
K-REF Fused Mullite (Produced by Keith Refractories Ltd.) . . . . .	363
K-REF Fused Zirconia Mullite (Produced by Keith Refractories Ltd.) . . . . .	364
K-REF Sintered Mullite (Produced by Keith Refractories Ltd.) . . . . .	364
K-REF 63 (Produced by Keith Refractories Ltd.) . . . . .	365
K-REF White Fused Mullite (Produced by Keith Refractories Ltd.) . . . . .	366
<b>Remet</b> . . . . .	367
REMASIL—Alumino Silicates . . . . .	367
REMULL—Alumino Silicates . . . . .	368
<b>Sohio Electro Minerals</b> . . . . .	369
Fused, High Purity White Mullite Grain . . . . .	369
Fused, High Purity Zirconia-Mullite Grain . . . . .	370
<b>NEPHELINE SYENITE</b> . . . . .	371
<b>Indusmin</b> . . . . .	371
Grade A-200 “Lakefield” Nepheline Syenite . . . . .	371
Grade A-270 “Lakefield” Nepheline Syenite . . . . .	372
Grade A-400 “Lakefield” Nepheline Syenite . . . . .	373
<b>NICKEL COMPOUNDS</b> . . . . .	374
<b>EM Industries</b> . . . . .	374
Nickel Oxide SELECTIPUR . . . . .	374
<b>Hall Chemical</b> . . . . .	374
Nickel Carbonate—Purified . . . . .	374
Nickel Oxide—Black . . . . .	374
Nickel Oxide—Green . . . . .	374

<b>McGean-Rohco</b> . . . . .	375
Nickel Carbonate—Basic . . . . .	375
Nickel Nitrate and Nickel Oxide . . . . .	375
Nickel Sulfate—High Purity . . . . .	375
Nickel Sulfate—Platers Grade . . . . .	376
Nickel Sulfate Solution—High Purity . . . . .	376
<b>OCHRE</b> . . . . .	377
<b>New Riverside Ochre</b> . . . . .	377
Ochre Pigments . . . . .	377
<b>PERICLASE</b> . . . . .	378
<b>Martin Marietta Magnesia Specialties</b> . . . . .	378
96% MgO Periclase 4-1 . . . . .	378
96% MgO Periclase H-D (High Density) 4-1 . . . . .	378
98% MgO Periclase 1-1 . . . . .	378
<b>National Magnesia Chemicals</b> . . . . .	379
KF-95—95% MgO Sintered Periclase . . . . .	379
KF-98—98% MgO Sintered Periclase . . . . .	380
<b>PETALITE</b> . . . . .	381
<b>Hammill &amp; Gillespie</b> . . . . .	381
Petalite . . . . .	381
<b>PHOSPHATES</b> . . . . .	382
<b>Cometals</b> . . . . .	382
Aluminium Metaphosphate (Aluminium Tetrphosphate) (Produced by Chemische Fabrik Budenheim) . . . . .	382
Disodium Phosphate (Secondary Sodium Orthophosphate, Disodium Monohydrogen Monophosphate) (Produced by Chemische Fabrik Budenheim) . . . . .	382
Glassy Polyphosphates—BUDIT and BUDIT H (Produced by Chemische Fabrik Budenheim) . . . . .	384
Lithium Phosphates . . . . .	385
Magnesium Metaphosphate . . . . .	385
Monoammonium Phosphate—FABUTIT 746 (Produced by Chemische Fabrik Budenheim) . . . . .	386
Monosodium Phosphate—Standard Line (Primary Sodium Orthophosphate, Monosodium Dihydrogen Monophosphate) (Produced by Chemische Fabrik Budenheim) . . . . .	387
<b>FMC</b> . . . . .	388
Monocalcium Phosphate . . . . .	388
Potassium Tripolyphosphate—Technical Grade . . . . .	389
Sodium Hexametaphosphate—Technical Grade . . . . .	390
Sodium Tripolyphosphate—Technical Grade . . . . .	391
Tetrapotassium Pyrophosphate—Technical Grade . . . . .	392
Tetrasodium Pyrophosphate—Technical Grade . . . . .	393
<b>POTASSIUM COMPOUNDS</b> . . . . .	394
<b>Cometals</b> . . . . .	394
Potassium Carbonate . . . . .	394
Powdered Potassium Silicate—PORTIL Potassium . . . . .	394
<b>PYROPHYLLITE</b> . . . . .	395
<b>R.T. Vanderbilt</b> . . . . .	395
PYRAX HS Pyrophyllite . . . . .	395
PYRAX RG—Refractory Grade Pyrophyllite . . . . .	396

<b>QUARTZ</b> . . . . .	399
<b>Engineered Materials</b> . . . . .	399
Candle Quartz—GEM-440 . . . . .	399
Fused Quartz—GEM-435 . . . . .	399
Semi-Clear Candle Quartz—GEM-445 . . . . .	399
Star Quartz—GEM-480 . . . . .	399
White Quartz—GEM-460 . . . . .	400
<b>J.F. Jelenko</b> . . . . .	400
Crystalline Quartz Powder . . . . .	400
Transparent Fused Quartz Powder . . . . .	400
<b>Pacer</b> . . . . .	401
SUPER QUARTZ—Natural Crystalline Quartz . . . . .	401
ULTRA QUARTZ—Natural Crystalline Quartz . . . . .	401
<b>Particle Processing &amp; Classifying</b> . . . . .	402
GEM 435 Fused Quartz . . . . .	402
GEM 440 Clear Candle Quartz—Optical/Dental Grade . . . . .	402
GEM 460 White Quartz—Electronic Grade . . . . .	403
PARTIGLO 280 Crystalline Quartz . . . . .	403
<b>U.S. Silica</b> . . . . .	404
MYSTIK WHITE Quartz Aggregate . . . . .	404
MYSTIK WHITE Quartz Stone . . . . .	404
Q-MIX White Quartz Aggregate . . . . .	404
<b>RUTILE</b> . . . . .	405
<b>Continental Mineral Processing</b> . . . . .	405
Rutile Ore—Australian . . . . .	405
<b>F &amp; S Alloys and Minerals</b> . . . . .	406
Rutile—Air-Floated Grade . . . . .	406
<b>Tam Ceramics</b> . . . . .	406
Ceramic Rutile . . . . .	406
Granular Rutile—RUFLUX 84 . . . . .	407
Milled Rutile—RUFLUX 61 . . . . .	407
<b>SAND</b> . . . . .	408
<b>Arkholo Sand and Gravel</b> . . . . .	408
Feldspathic Glass Sand . . . . .	408
<b>Central Silica</b> . . . . .	408
Whole Grain Sands . . . . .	408
<b>Du Pont</b> . . . . .	409
Florida Zircon Sands . . . . .	409
<b>U.S. Silica</b> . . . . .	411
MYSTIC WHITE Architectural Sand . . . . .	411
<b>Wedron Silica</b> . . . . .	411
WEDRON Silica Sand . . . . .	411
<b>SILICA</b> . . . . .	412
<b>C-E Minerals</b> . . . . .	412
TECO-SIL Fused Silica . . . . .	412
<b>F &amp; S Alloys and Minerals</b> . . . . .	413
Fumed Amorphous Silica . . . . .	413
<b>Illinois Minerals</b> . . . . .	414
Amorphous Silica . . . . .	414
<b>Remet</b> . . . . .	415
REMET Fused Silica . . . . .	415
<b>U.S. Silica</b> . . . . .	416
MIN-U-SIL Micron-Sized Silica . . . . .	416
MYSTIC WHITE Ground Silica . . . . .	417

MYSTIC WHITE Silica Products . . . . .	418
#1 Special Silica . . . . .	419
SIL-CO-SIL Ground Silicas . . . . .	420
Whole Grain Silicas . . . . .	422
<b>SILICON</b> . . . . .	423
<b>F &amp; S Alloys and Minerals</b> . . . . .	423
Silicon Metal Fines—Grade SMFA . . . . .	423
<b>Superior Graphite</b> . . . . .	423
SICOMIL Processed Silicon Powders for Engineering Ceramics (Produced by KemaNord Industrikeri) . . . . .	423
<b>SILICON CARBIDE</b> . . . . .	425
<b>Advanced Refractory Technologies</b> . . . . .	425
Silicon Carbide . . . . .	425
<b>AGIP USA</b> . . . . .	426
MECCARB NERO BT Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	426
MECCARB NERO H Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	426
MECCARB NERO HMF Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	427
MECCARB NERO H/REF Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	427
MECCARB NERO H/TM Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	428
MECCARB NERO K Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	428
MECCARB NERO K-P Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	429
MECCARB NERO K/REF Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	429
MECCARB NERO M Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	430
MECCARB NERO AND VERDE FINES (Produced by Samim Abrasivi SpA) . . . . .	430
MECCARB NERO AND VERDE MCR (Produced by Samim Abrasivi SpA) . . . . .	430
MECCARB VERDE K Silicon Carbide (Produced by Samim Abrasivi SpA) . . . . .	431
<b>Cometals</b> . . . . .	431
Chinese Crude Black Silicon Carbide 90.00% Minimum . . . . .	431
Chinese Crude Black Silicon Carbide 97.00% Minimum . . . . .	431
<b>Coors Porcelain</b> . . . . .	432
CERATHERM—Coors Reaction Bonded Silicon Carbides . . . . .	432
<b>Exolon-ESK</b> . . . . .	433
CARBOLON DC—Silicon Carbide Dust Collector Fines . . . . .	433
No. 1 CARBOLON—Silicon Carbide Refractory Grain . . . . .	433
No. 5 CARBOLON—Silicon Carbide Refractory Grain . . . . .	433
<b>Ferro, Abrasives Division</b> . . . . .	434
ELECTROCARB Silicon Carbide Powders . . . . .	434
<b>General Abrasive</b> . . . . .	434
Silicon Carbide Powders . . . . .	434
<b>ICD Group</b> . . . . .	436
Silicon Carbide Abrasive Grains . . . . .	436
<b>Lonza</b> . . . . .	436
CARBOGRAN BLACK Silicon Carbide . . . . .	436
CARBOGRAN GREEN Silicon Carbide . . . . .	436
CARBOGRAN-UF Ultrafine Silicon Carbide Powders . . . . .	437
CARBOMANT Black Silicon Carbide . . . . .	437
<b>Norton</b> . . . . .	438
37 CRYSTOLON Black Silicon Carbide . . . . .	438
<b>Particle Processing &amp; Classifying</b> . . . . .	438
Silicon Carbides . . . . .	438
<b>Sohio Electro Minerals</b> . . . . .	439
No. 1 Refractory Silicon Carbide Grain . . . . .	439
No. 5 Refractory Silicon Carbide Fines . . . . .	440
No. 5 Refractory Silicon Carbide Grain . . . . .	440

<b>Hermann C. Starck</b> . . . . .	441
Alpha-SiC—Grade A 10. . . . .	441
Beta-SiC—Grade B 10. . . . .	442
<b>Superior Graphite</b> . . . . .	443
HSC Silicon Carbide—100GL Grade . . . . .	443
HSC Silicon Carbide—ROF Grade. . . . .	444
<b>SILICON NITRIDE</b> . . . . .	445
<b>ICD Group</b> . . . . .	445
Silicon Nitride N4-F. . . . .	445
<b>Hermann C. Starck</b> . . . . .	446
Alpha-Si <sub>3</sub> N <sub>4</sub> —Grade H 1 . . . . .	446
Alpha-Si <sub>3</sub> N <sub>4</sub> —Grade H 2. . . . .	447
Alpha-Si <sub>3</sub> N <sub>4</sub> —Grade LC 1 . . . . .	448
Alpha-Si <sub>3</sub> N <sub>4</sub> —Grade LC 10 . . . . .	449
Alpha-Si <sub>3</sub> N <sub>4</sub> —Grade LC 12 . . . . .	450
<b>Superior Graphite</b> . . . . .	451
SICONIDE Processed Silicon Nitride Powders for Engineering Ceramics (Produced by KemaNord Industriekemi). . . . .	451
<b>Toyo Soda USA</b> . . . . .	452
TSK Silicon Nitrides . . . . .	452
<b>SILLIMANITE</b> . . . . .	453
<b>Muscle Shoals Minerals</b> . . . . .	453
Sillimanite Grade 63AS . . . . .	453
<b>Refractory Minerals</b> . . . . .	453
K-REF 63 . . . . .	453
<b>SLAGS</b> . . . . .	454
<b>Calumite</b> . . . . .	454
Calumite Slag . . . . .	454
MELITE-40 . . . . .	454
<b>SOAPSTONE</b> . . . . .	455
<b>E.C.C. America</b> . . . . .	455
Raw Soapstone SPB-20. . . . .	455
<b>SODA ASH</b> . . . . .	456
<b>FMC</b> . . . . .	456
Soda Ash—Light Density and Dense Grades . . . . .	456
<b>General Chemical</b> . . . . .	458
Soda Ash . . . . .	458
<b>Tenneco Minerals</b> . . . . .	459
Dense Soda Ash . . . . .	459
<b>Texasgulf Chemicals</b> . . . . .	459
Soda Ash—Standard . . . . .	459
<b>SODIUM SILICATE</b> . . . . .	460
<b>Cometals</b> . . . . .	460
Powdered Sodium Silicate Portil Alkaline. . . . .	460
Powdered Sodium Silicate Portil Neutral . . . . .	460
<b>ICD</b> . . . . .	461
Sodium Silicate Powders. . . . .	461
<b>SODIUM SULFATE</b> . . . . .	462
<b>Ozark-Mahoning</b> . . . . .	462
Brownfield, Texas Sodium Sulfate . . . . .	462

Seagraves, Texas Sodium Sulfate . . . . .	463
<b>SPARS</b> . . . . .	464
<b>Feldspar</b> . . . . .	464
Glass Spars . . . . .	464
Pottery Spars . . . . .	464
<b>SPINEL</b> . . . . .	465
<b>Baikowski International</b> . . . . .	465
High Purity Ceramic Spinel Powder . . . . .	465
<b>Industrial Minerals</b> . . . . .	466
Spinel . . . . .	466
Spinel SP-12 . . . . .	466
<b>National Magnesia Chemicals</b> . . . . .	467
KRINEL—Magnesia Chrome Spinel . . . . .	467
MC-60S—Magnesia Chrome Spinel . . . . .	468
<b>Refractory Minerals</b> . . . . .	469
K-REF Sintered Magnesia Alumina Spinel (Produced by Keith Refractories Ltd.) . . . . .	469
<b>Sohio Electro Minerals</b> . . . . .	470
Fused, High Purity Magnesia-Alumina Spinel Grain . . . . .	470
<b>Trans-Tech</b> . . . . .	471
Conductive Spinel . . . . .	471
Magnesium Aluminate Spinel . . . . .	471
<b>SPODUMENE</b> . . . . .	473
<b>Amalgamet Canada</b> . . . . .	473
"Run of Mine" Spodumene ex Greenbushes Tin Ltd. . . . .	473
Spodumene Concentrate . . . . .	473
Spodumene Concentrates . . . . .	474
<b>Cometals</b> . . . . .	474
Chinese Low Iron Spodumene . . . . .	474
<b>Foote Mineral</b> . . . . .	475
Chemical Grade Spodumene (50/200 Mesh) . . . . .	475
Chemical Grade Spodumene (200 Mesh) . . . . .	475
<b>STANNATES</b> . . . . .	476
<b>M&amp;T Chemicals</b> . . . . .	476
M&T Electronic Ceramic Stannates . . . . .	476
<b>Tam Ceramics</b> . . . . .	477
Barium Stannate—TICON 7 Barium S . . . . .	477
Bismuth Stannate—TICON 5 Bismuth S . . . . .	477
Calcium Stannate—TICON 9 Calcium S . . . . .	478
Cerium Stannate—TICON 3 Cerium S . . . . .	479
Magnesium Stannate—TICON 1 Magnesium S . . . . .	480
<b>STANNIC OXIDE</b> . . . . .	481
<b>Ferro, Transelco Division</b> . . . . .	481
Stannic Oxide . . . . .	481
<b>ICD Group</b> . . . . .	481
Tin Oxides . . . . .	481
<b>STRONTIUM CARBONATE</b> . . . . .	482
<b>Kali-Chemie</b> . . . . .	482
KC Strontium Carbonate—Commercial Grades . . . . .	482
<b>TALC (STEATITE)</b> . . . . .	483
<b>Cometals</b> . . . . .	483
Chinese High Brightness Talc . . . . .	483

<b>Cyprus Industrial Minerals, Talc Division</b> . . . . .	483
MISTRON VAPOR . . . . .	483
STEAWHITE 200 . . . . .	484
STEAWHITE 325 . . . . .	484
YELLOWSTONE . . . . .	485
<b>Pfizer</b> . . . . .	486
CERCROn—High Purity Montana Talc . . . . .	486
CERCROn MP 99-54 Talc . . . . .	487
<b>L.A. Salomon</b> . . . . .	488
Talc 2 (Produced by American French Talc) . . . . .	488
<b>R.T. Vanderbilt</b> . . . . .	489
Fractionated Talcs . . . . .	489
200 Mesh Talcs . . . . .	490
325 Mesh Talcs . . . . .	491
<b>TITANATES</b> . . . . .	492
<b>Advanced Ceramic Technologies</b> . . . . .	492
Barium Titanate 8A5 . . . . .	492
Calcium Titanate 8A41 . . . . .	492
Calcium Titanate 8CH . . . . .	492
<b>Ferro, Transelco Division</b> . . . . .	493
Lanthanum Rare Earth Titanate . . . . .	493
Magnesium Titanate . . . . .	493
Neodymium Titanate . . . . .	494
Strontium Titanate . . . . .	494
<b>Tam Ceramics</b> . . . . .	495
Bismuth Titanate—TICON 85 BISMUTH T. . . . .	495
Calcium Titanate—TICON 65 CALCIUM T. . . . .	496
Lead Titanate—TICON 95 LEAD T. . . . .	497
Strontium Titanate—TICON 55 STRONTIUM T. . . . .	498
<b>TITANIUM BORIDE</b> . . . . .	499
<b>Advanced Refractory Technologies</b> . . . . .	499
Titanium Diboride . . . . .	499
<b>ICD Group</b> . . . . .	499
Japanese Titanium Diboride . . . . .	499
Titanium Diboride Solids . . . . .	500
<b>Hermann C. Starck</b> . . . . .	501
Titanium Boride—Grade A . . . . .	501
Titanium Boride—Grade B . . . . .	502
Titanium Boride—Grade C . . . . .	503
Titanium Boride—Grade D . . . . .	504
Titanium Boride—Grade E . . . . .	505
<b>TITANIUM CARBIDE</b> . . . . .	506
<b>Advanced Refractory Technologies</b> . . . . .	506
Titanium Carbide . . . . .	506
<b>Kennametal</b> . . . . .	507
Titanium Carbide (MP-56) . . . . .	507
Titanium Carbonitride TiC/TiN Solid Solution . . . . .	507
<b>Hermann C. Starck</b> . . . . .	508
Titanium Carbide—Ceramic Grades . . . . .	508
Titanium Carbide—Standard Grades A, B, C . . . . .	508
<b>TITANIUM DIOXIDE</b> . . . . .	509
<b>EM Industries</b> . . . . .	509
Titanium(IV) Oxide SELECTIPUR . . . . .	509

<b>Ferro, Transelco Division</b> . . . . .	509
Titanium Dioxide . . . . .	509
<b>NL Chemicals</b> . . . . .	510
TITANOX 3020—Non-Pigmentary for Glass . . . . .	510
<b>Tam Ceramics</b> . . . . .	511
Heavy Grade Titanium Dioxide . . . . .	511
<b>TITANIUM NITRIDE</b> . . . . .	512
<b>Kennametal</b> . . . . .	512
Titanium Nitride . . . . .	512
<b>Hermann C. Starck</b> . . . . .	512
Titanium Nitride—Grade A . . . . .	512
Titanium Nitride—Grade B . . . . .	513
<b>ULEXITE</b> . . . . .	514
<b>American Borate Company</b> . . . . .	514
Turkish Ulexite . . . . .	514
<b>VERMICULITE</b> . . . . .	515
<b>Cometals</b> . . . . .	515
Chinese Unexpanded Vermiculite . . . . .	515
<b>WHITING (CHALK)</b> . . . . .	516
<b>Hammill &amp; Gillespie</b> . . . . .	516
SNOWCAL 40 (Yorkshire English Whiting) . . . . .	516
<b>WOLLASTONITE</b> . . . . .	517
<b>Cometals</b> . . . . .	517
Crude Chinese Wollastonite . . . . .	517
<b>Pfizer</b> . . . . .	517
California Wollastonite . . . . .	517
<b>R.T. Vanderbilt</b> . . . . .	518
VANSIL W Wollastonite Products . . . . .	518
<b>YTTRIUM OXIDE</b> . . . . .	520
<b>Trans-Tech</b> . . . . .	520
Yttrium Oxide . . . . .	520
<b>ZINC OXIDE</b> . . . . .	521
<b>American Chemet</b> . . . . .	521
Densified Zinc Oxide . . . . .	521
Zinc Dross . . . . .	521
ZINOX Grade 350 . . . . .	522
<b>Eagle Zinc</b> . . . . .	523
DENZOX No. 730 Zinc Oxide . . . . .	523
<b>EM Industries</b> . . . . .	523
Zinc Oxide SELECTIPUR . . . . .	523
<b>New Jersey Zinc</b> . . . . .	524
HORSE HEAD XX-78 Zinc Oxide . . . . .	524
HORSE HEAD XX-504 Zinc Oxide . . . . .	524
KADOX-15 Zinc Oxide . . . . .	525
<b>St. Joe Resources</b> . . . . .	526
No. 500 French Process Zinc Oxide . . . . .	526
No. 911 French Process Zinc Oxide . . . . .	526
No. 920 French Process Zinc Oxide . . . . .	527
No. 922 French Process Zinc Oxide . . . . .	527

<b>ZIRCON (ZIRCONIUM SILICATE)</b> . . . . .	528
<b>Allied Mineral Products</b> . . . . .	528
MINRO 65Z (Zircon Brick Grog) . . . . .	528
<b>AluChem</b> . . . . .	529
AluChem Zircon Sand Grade SAP . . . . .	529
Ground Zircon Flour Grade GCS . . . . .	529
Ground Zircon Flour Grade SAP . . . . .	530
Zircon Sand (Calcined) Grade GCS . . . . .	530
<b>American Minerals</b> . . . . .	531
Zircon—Sand and Flour . . . . .	531
<b>Continental Mineral Processing</b> . . . . .	532
Zircon Ore 1086 AMA . . . . .	532
Zircon Ore 1186 WS . . . . .	532
<b>F &amp; S Alloys and Minerals</b> . . . . .	533
Zircon Sand—Australian Grade A8590 . . . . .	533
<b>Ferro, Zirconia Operation</b> . . . . .	533
Dissociated Zircon DZ910 . . . . .	533
<b>M&amp;T Chemicals</b> . . . . .	534
M&T METCON Flour—325 . . . . .	534
M&T Zircons for Ceramic and Foundry Use . . . . .	534
MILLTROX Zirconium Silicate . . . . .	537
ULTROX Zirconium Silicate Glaze Opacifiers . . . . .	538
<b>Remet</b> . . . . .	540
REMETS Milled Zircon . . . . .	540
REMETS Zircon Sand . . . . .	540
<b>Tam Ceramics</b> . . . . .	541
Milled Zircons . . . . .	541
Zirconite Sand A and G Zircon Granular DR . . . . .	542
Zirconium Double Silicates . . . . .	543
Zirconium Silicates . . . . .	545
ZIRCOPAX PLUS and SUPERPAX PLUS . . . . .	546
 <b>ZIRCONATES</b> . . . . .	 547
<b>Ferro, Transelco Division</b> . . . . .	547
Magnesium Zirconate . . . . .	547
Strontium Zirconate . . . . .	547
<b>Tam Ceramics</b> . . . . .	548
Barium Zirconate—TICON 140 Barium Z . . . . .	548
Bismuth Zirconate—TICON 150 Bismuth Z . . . . .	549
Calcium Zirconate—TICON 110 Calcium Z and TICON 120 Calcium Z . . . . .	550
Magnesium Zirconate—TICON 130 Magnesium Z . . . . .	551
Strontium Zirconate—TICON 160 Strontium Z . . . . .	552
 <b>ZIRCONIA (ZIRCONIUM OXIDE)</b> . . . . .	 553
<b>Ceramtec</b> . . . . .	553
Ceramtec Zirconia Ceramics . . . . .	553
<b>Ceres</b> . . . . .	554
Single Crystal Cubic Zirconia . . . . .	554
High Purity Fused Zirconia Grain Insulation . . . . .	554
<b>Cometals</b> . . . . .	555
ZIRCOMUL EF—Mullite Zirconia Electrofused . . . . .	555
ZIRCOMUL S—Sintered Mullite Zirconia 50/20 . . . . .	555
<b>Coors Porcelain</b> . . . . .	556
TTZ—Transformation Toughened Zirconia . . . . .	556
<b>Corning Ceramics</b> . . . . .	557
Zirconium Oxide Granular Products . . . . .	557

<b>Ferro, Transelco Division</b> . . . . .	559
Zirconium Oxide . . . . .	559
Zirconium Oxide Setter Powders . . . . .	559
<b>Ferro, Zirconia Operation</b> . . . . .	560
Monoclinic Zirconium Dioxide . . . . .	560
Zirconium Oxide Grade RA4885 . . . . .	560
<b>ICD Group</b> . . . . .	561
HSY Zirconia (Produced by Daiichi Kigenso) . . . . .	561
<b>Industrial Minerals</b> . . . . .	562
Monoclinic Zirconia . . . . .	562
Zirconia HSY-2.6 . . . . .	563
Zirconia HSY-3.0 . . . . .	563
<b>Magnesium Elektron</b> . . . . .	564
Zirconium Oxide—Ceramic Pigment Grades . . . . .	564
Zirconium Oxide—Electronic Grades . . . . .	564
Zirconium Oxide—Glass & Gemstone Grades . . . . .	565
Zirconium Oxide—Mixed Metal Oxide Grades . . . . .	565
Zirconium Oxide—Special Ceramic Grades . . . . .	566
<b>Adolph Meller</b> . . . . .	566
Zirconia (Produced by Criceram) . . . . .	566
<b>Muscle Shoals Minerals</b> . . . . .	567
Lime Stabilized Zirconia Grade 95ZC . . . . .	567
Magnesia Stabilized Zirconia Grade 3MZ . . . . .	567
Pure Zirconia Grade 99Z . . . . .	568
Zirconia Grade 98Z . . . . .	568
<b>Norton</b> . . . . .	569
Zirconia H . . . . .	569
Zirconia I . . . . .	569
Zirconia M . . . . .	570
Zirconia Q . . . . .	570
Zirconia Q5A 10 . . . . .	571
<b>Tam Ceramics</b> . . . . .	571
Monoclinic Zirconia Grain . . . . .	571
Stabilized Zirconium Oxides . . . . .	572
TAMFIRE Setter Sands for Firing of Electronic Ceramics . . . . .	574
ZIROX Milled Monoclinic Zirconia . . . . .	574
<b>Toyo Soda USA</b> . . . . .	576
TSK-Zirconia Powder Series . . . . .	576
TSK-Zirconia Powder TZ-3Y . . . . .	577
TSK-Zirconia Powder TZ-3YA "Plus" . . . . .	578
TSK "SUPER-Z" Zirconia-Alumina Powder 3Y20A Grade . . . . .	580
Properties of TSK-Zirconia Ceramics . . . . .	581
<b>Zircar Products</b> . . . . .	582
Zirconia Low Mass Grog ZG . . . . .	582
Zirconia Powder Type ZYP . . . . .	583
<b>Zirconia Sales (America)</b> . . . . .	584
Partially Stabilized Zirconias (PSZ) (Produced by Daiichi Kigenso) . . . . .	584
Zirconium Oxides DK-1, DK-2, DK-3, and DK-4 (Produced by Daiichi Kigenso) . . . . .	585
Zirconium Oxide DK-5 . . . . .	585
Zirconium Oxide Grade N . . . . .	586
Zirconium Oxide Grade SQ . . . . .	586
<b>Z-Tech</b> . . . . .	587
Crystalline Zirconia . . . . .	587
<b>ZIRCONIUM BORIDE</b> . . . . .	588
<b>Advanced Refractory Technologies</b> . . . . .	588
Zirconium Diboride . . . . .	588

<b>Hermann C. Starck</b> . . . . .	589
Zirconium Boride Grade A . . . . .	589
<b>ZIRCONIUM NITRIDE</b> . . . . .	590
<b>Hermann C. Starck</b> . . . . .	590
Zirconium Nitride Grade A . . . . .	590

## PART II ADDITIVES AND SPECIAL MATERIALS

<b>BINDERS</b> . . . . .	592
<b>Cometals</b> . . . . .	592
FABUTIT G 47—Chemical Binder for Basic Monolithic Refractories (Produced by Chemische Fabrik Budenheim Rudolf A. Oetker) . . . . .	592
FABUTIT G 131—Chemical Binder for Refractory Clays (Produced by Chemische Fabrik Budenheim Rudolf A. Oetker) . . . . .	592
FABUTIT 705—Chemical Binder for Refractory Clays (Produced by Chemische Fabrik Budenheim Rudolf A. Oetker) . . . . .	593
FABUTIT 716—Powder-Type, Acid Binder for Refractory Clays (Produced by Chemische Fabrik Budenheim Rudolf A. Oetker) . . . . .	593
FABUTIT 761—Chemical Binder for Refractory Materials (Produced by Chemische Fabrik Budenheim Rudolf A. Oetker) . . . . .	594
<b>Dow Chemical</b> . . . . .	595
METHOCEL Cellulose Ethers . . . . .	595
<b>Dynamit Nobel Chemicals</b> . . . . .	597
DYNASIL 40 . . . . .	597
DYNASIL A . . . . .	597
DYNASIL M . . . . .	598
<b>E.C.C. America</b> . . . . .	599
BENTOLITE L-3—Plasticizer-Binder for Plastic Refractory Mixes . . . . .	599
<b>FMC</b> . . . . .	599
Phosphoric Acid—Technical Grade . . . . .	599
Sodium Hexametaphosphate—Technical Grade . . . . .	600
Superphosphoric and Polyphosphoric Acids—Technical Grade . . . . .	601
<b>Hercules</b> . . . . .	602
HERCULES Cellulose Gum—Purified Sodium Carboxymethylcellulose . . . . .	602
KLUCEL Hydroxypropylcellulose . . . . .	603
NATROSOL 250 Hydroxyethylcellulose . . . . .	604
Water-Soluble Polymer Additives for Ceramic Processing . . . . .	605
<b>Lehigh Portland Cement</b> . . . . .	607
LUMNITE and REFCON Calcium Aluminate Cements . . . . .	607
<b>Monsanto Polymer Products</b> . . . . .	608
BUTVAR Polyvinyl Butyral Resins . . . . .	608
<b>Petrolite Specialty Polymers Group</b> . . . . .	610
Hard Microcrystalline Waxes . . . . .	610
Modified Hydrocarbons . . . . .	610
<b>PQ</b> . . . . .	611
KASIL Potassium Silicates . . . . .	611
Sodium Silicate ACOR-E16 . . . . .	611
Sodium Silicate ACOR-E32 . . . . .	611
Sodium Silicates—Liquids/Solids . . . . .	612
<b>Reed Lignin</b> . . . . .	613
ADDITIVE-A Clay Conditioners . . . . .	613
GLUTRIN . . . . .	614
GOULAC . . . . .	614
NORLIG 41N . . . . .	615

<b>Remet Chemical</b> . . . . .	616
DISPERAL . . . . .	616
Prehydrolyzed Ethyl Silicate R-18 . . . . .	616
Prehydrolyzed Ethyl Silicate R-20 . . . . .	617
Prehydrolyzed Ethyl Silicate R-25 . . . . .	618
REMAL 20 . . . . .	618
REMASOL—Colloidal Silica . . . . .	619
SILESTER A-1 . . . . .	619
SILESTER OS . . . . .	620
Zirconia Sol—Acetate Stabilized . . . . .	621
Zirconia Sol—Nitrate Stabilized . . . . .	622
<b>Stauffer Chemical</b> . . . . .	623
SILBOND H-4—Ethyl Polysilicate . . . . .	623
SILBOND H-5—Ethyl Polysilicate . . . . .	623
SILBOND H-6—Ethyl Polysilicate . . . . .	624
SILBOND H-6C—Ethyl Polysilicate . . . . .	625
SILBOND 40—Ethyl Polysilicate . . . . .	625
SILBOND Condensed—Tetra Ethyl Ortho Silicate 90% . . . . .	626
SILBOND Pure—Tetra Ethyl Ortho Silicate 99% . . . . .	626
<b>CERAMIC ADDITIVES</b> . . . . .	627
<b>Cometals</b> . . . . .	627
FABUTIT G 154 (Produced by Chemische Fabrik Budenheim Rudolf A. Oetker) . . . . .	627
FABUTIT 743 (Produced by Chemische Fabrik Budenheim Rudolf A. Oetker) . . . . .	627
FABUTIT 753 (Produced by Chemische Fabrik Budenheim Rudolf A. Oetker) . . . . .	628
FABUTIT 796 (Produced by Chemische Fabrik Budenheim Rudolf A. Oetker) . . . . .	628
<b>Pakco Industrial Ceramics</b> . . . . .	629
PAKCO-LITHAFRAX Powders . . . . .	629
<b>R.T. Vanderbilt</b> . . . . .	630
VANCIDE 51Z . . . . .	630
VEEGUM CER . . . . .	630
VEEGUM PRO . . . . .	631
VEEGUM T . . . . .	631
<b>CERAMIC ADHESIVES, POTTING MATERIALS AND PUTTY</b> . . . . .	632
<b>Aremco Products</b> . . . . .	632
CERAMABOND and ULTRA-TEMP High Temperature Ceramic Adhesives . . . . .	632
CERAMABOND 618 Low Expansion Ceramic Adhesive . . . . .	633
GRAPHI-BOND 551 High Temperature Graphite Adhesive . . . . .	633
CERAMAPOT High Temperature Potting Materials . . . . .	634
PYRO-PUTTY 600 High Temperature Ceramic Putty . . . . .	635
<b>Cotronics</b> . . . . .	635
Ceramic Adhesives 900 Series . . . . .	635
Alumina Adhesive 903 Green . . . . .	636
Graphite Adhesive 931 . . . . .	637
Zirconia Adhesive 904 . . . . .	637
DURAPOT Ceramic Potting Compounds to 3000°F . . . . .	638
<b>Zircar Products</b> . . . . .	639
ZIRCAR Alumina Cement . . . . .	639
ZIRCAR Zirconia Cement . . . . .	639
<b>CERAMIC COATINGS</b> . . . . .	640
<b>Aremco Products</b> . . . . .	640
AREMCO-COAT 567—High Temperature Silicone-Ceramic-Glass Coating . . . . .	640
AREMCO-SEAL High Temperature Sealants . . . . .	640
AREMCO-SHIELD EMI/RFI Conductive Adhesive/Putty/Coating . . . . .	641
CERAMACOAT 512 . . . . .	642

CERAMACOAT High Temperature Protective Coatings . . . . .	643
CERAMA-DIP 538 High Temperature Coating and End Sealant . . . . .	644
PYRO-DUCT High Temperature Electrically Conductive Coatings . . . . .	644
<b>Materials Technology</b> . . . . .	645
MTC DURA-COTE Silicon Carbide . . . . .	645
MTC DURA-COTE Titanium Carbide . . . . .	646
<b>Metallizing Company of America</b> . . . . .	647
Ceramic Powders for Thermal Spraying . . . . .	647
Flame Spray KO Rods . . . . .	647
<b>Metco</b> . . . . .	648
Magnesium Zirconate Powder METCO 210NS-1 . . . . .	648
Yttria Stabilized Zirconia Powder METCO 204NS . . . . .	649
Yttria Stabilized Zirconia Powder METCO 204B-NS . . . . .	650
<b>Trans-Tech</b> . . . . .	652
Alumina-Chromia . . . . .	652
<b>CERAMIC COLORS</b> . . . . .	653
<b>Cookson Ceramics &amp; Antimony</b> . . . . .	653
Cadmium Selenium Decorative Range . . . . .	653
Glass Enamels . . . . .	653
IG2 Series—Inglaze Colors for the Fast Fire Decoration Porcelain at 1180°-1260°C . . . . .	654
Low Metal Release Cadmium Selenium Range . . . . .	655
Low Metal Release Lithographic Colors . . . . .	655
METALYKS . . . . .	656
Series 79 . . . . .	656
Series 79 Gold Colors . . . . .	657
Series 80—Leadless Onglaze Colors . . . . .	657
Series 82 Enamels . . . . .	658
<b>Engineered Materials</b> . . . . .	659
MASON Ceramic Colors (Produced by Mason Color & Chemical Works, Inc.) . . . . .	659
<b>Ferro, Coatings and Color Divisions</b> . . . . .	662
Ceramic Color Recommendations . . . . .	662
<b>CERAMIC FIBERS AND WHISKERS</b> . . . . .	663
<b>Avco Specialty Materials</b> . . . . .	663
TOKAWHISKER Silicon Carbide Whiskers (Produced by Tokai Carbon Co., Ltd.) . . . . .	663
<b>Babcock &amp; Wilcox</b> . . . . .	664
KAOWOOL Ceramic Fibers . . . . .	664
<b>Dow Corning</b> . . . . .	664
NICALON Silicon Carbide Fiber (Produced by Nippon Carbon Co. Ltd.) . . . . .	664
<b>ICD Group</b> . . . . .	665
Boron Nitride Fibers . . . . .	665
Potassium Titanate Fiber: TISMO (Produced by Otsuka) . . . . .	666
Silicon Carbide Whisker: SCW (Produced by Tateho Chemical Industries Co., Ltd.) . . . . .	667
Silicon Nitride Whisker: SNW (Produced by Tateho Chemical Industries Co., Ltd.) . . . . .	668
<b>Kaopolite</b> . . . . .	669
FIBERKAL Fibrous Calcined Kaolin . . . . .	669
<b>Manville</b> . . . . .	670
CERACHROME Bulk Fibers . . . . .	670
<b>3M</b> . . . . .	671
NEXTEL 312 Ceramic Fiber . . . . .	671
NEXTEL 440 Ceramic Fiber . . . . .	671
<b>Zircar Products</b> . . . . .	672
Alumina Bulk Fiber Type ALBF 1 . . . . .	672
SAFFIL Alumina LD Mat . . . . .	673
Zirconia Bulk Fibers Type ZYBF2 . . . . .	674

<b>CERAMIC MATERIALS</b> .....	675
<b>Aremco Products</b> .....	675
AREMCOLOX Machinable Ceramics .....	675
CERA-FAB 601 Castable/Machinable Ceramic .....	675
CERAMACAST High Temperature Castable Ceramics .....	676
<b>Atomergic Chemetals</b> .....	677
ROSOLITE—Lithium Aluminum Silicate .....	677
<b>Brush Wellman</b> .....	678
THERMALOX 995 Beryllia Ceramic .....	678
<b>Ceradyne</b> .....	681
CERALLOY Hot Pressed Ceramics .....	681
<b>Ceramatec</b> .....	682
Alumina Ceramics .....	682
Beta"-Alumina Ceramics .....	683
Ceramic Materials for Cutting Tools .....	684
<b>Coors Porcelain</b> .....	685
As Fired Dry Pressed Alumina Microceramics for Insulators, Thick Film Micro- electronic Circuits and Hybrid Bases .....	685
As Fired Alumina Substrates for Thick Film Microelectronic Circuits .....	686
Alumina Substrates for Thin Film Microelectronic Circuits .....	687
Mullite and Alumina Ceramics for Electrical Insulators, Severe Environments and Semiconductor Processing .....	688
Other Coors Ceramics Materials .....	689
<b>Cotronics</b> .....	692
Advanced Ceramic Castable .....	692
Ceramic Blankets—3000°F .....	693
Ceramic Board—3000°F .....	694
Ceramic Foam 310—3000°F .....	695
Ceramic Paper—3000°F .....	696
Ceramic Rope .....	696
Liquid Ceramic Foam 360LF—2500°C .....	697
Machinable Alumina 960—3000°F .....	698
Machinable Ceramics 902—2000°F .....	698
Machinable Glass Ceramics 914—1100°F .....	699
Moldable Ceramic 360M—2300°F .....	699
Precision Castable Alumina Ceramic RTC-60—3200°F .....	700
Ultra Temp 3000 Ceramics .....	700
WRAP-IT 372—3000°F .....	701
<b>Greenleaf Technical Ceramics</b> .....	702
GREENLEAF AB40 .....	702
GREENLEAF AB50 .....	703
GREENLEAF GEM 1 .....	704
GREENLEAF GEM 2 .....	705
GREENLEAF GEM 3 .....	706
GREENLEAF GEM 4 .....	707
<b>McDanel Refractory</b> .....	708
McDANEL Ceramic Materials .....	708
<b>Morton Thiokol, Alfa Products</b> .....	711
FRIALIT-DEGUSSIT High Purity Oxide Ceramics .....	711
<b>R I Ceramic</b> .....	712
Alumina Ceramics .....	712
<b>Thermatex</b> .....	713
THERMALITE Ceramic Fiber, Insulating Wet Blanket .....	713
THERMALITE 2300°F Ceramic Fiber Insulating Board .....	714
THERMALITE Ceramic Fiber, Vacuum-Formed Shapes .....	715
THERMALITE HP Blanket .....	716
THERMALITE LT Blanket .....	717

THERMALITE IO-LW Fiber Board. . . . .	718
THERMALITE 2300-H Ceramic Fiber Material. . . . .	718
THERMALITE 2300-HM Ceramic Fiber Material . . . . .	719
THERMALITE 2300-HM Impregnated Ceramic Fiber Material. . . . .	720
THERMALITE 2600-HM Ceramic Fiber Material . . . . .	721
THERMALITE 2600-H Ceramic Fiber Material. . . . .	722
THERMALITE 2600-HT Ceramic Fiber Material. . . . .	723
THERMALITE Mineral Wool Shapes. . . . .	724
THERMALITE-2300° Ceramic Fiber Utility Paper. . . . .	725
THERMALITE-2600° Ceramic Fiber HT Paper . . . . .	726
Ceramic Fiber Paper #1530-80 . . . . .	727
<b>Union Carbide</b> . . . . .	728
UCAR Hot-Pressed Boron Nitride. . . . .	728
<b>Zircar Products</b> . . . . .	730
Alumina-Silica Insulation Type ASH. . . . .	730
Refractory Sheet Type A Moldable. . . . .	731
Refractory Sheet Type D . . . . .	732
Refractory Sheet Type 99. . . . .	733
Refractory Sheet Type 100. . . . .	734
Zirconia Cloths . . . . .	735
Exotic Refractory Textiles . . . . .	736
Zirconia Felt Type ZYF . . . . .	737
Zirconia Insulating Board Type ZYFB. . . . .	738
Zirconia Insulating Board Type ZYZ3. . . . .	739
Zirconia Insulating Cylinders Type ZYC . . . . .	741
Zirconia Insulation Type FBC . . . . .	742
Zirconia Insulation Type FBD . . . . .	743
<b>CERAMIC PRECURSORS</b> . . . . .	745
<b>Dynamit Nobel Chemicals</b> . . . . .	745
Silicon Carbide Precursors. . . . .	745
Silicon Dioxide Precursors. . . . .	747
Silicon Nitride Precursors . . . . .	750
<b>DIELECTRIC COMPOSITIONS</b> . . . . .	751
<b>Countis</b> . . . . .	751
Microwave Dielectrics. . . . .	751
<b>Dimat</b> . . . . .	752
Formulated Dielectric Compositions—Class I—Temperature Compensating Series. . . . .	752
Formulated Dielectric Compositions—Class II—High-K . . . . .	755
Extended Temperature Bodies N1500 Through N5600. . . . .	756
<b>Owens-Illinois</b> . . . . .	757
Dielectric Coating ESG-1015. . . . .	757
Dielectric Glass PP-200. . . . .	757
<b>Tam Ceramics</b> . . . . .	758
TAMTRON COG 150H . . . . .	758
TAMTRON COG150L . . . . .	760
TAMTRON COG600H. . . . .	762
TAMTRON COG600L . . . . .	764
TAMTRON X7P152L . . . . .	766
TAMTRON X7P182H . . . . .	768
TAMTRON X7R162L . . . . .	770
TAMTRON X7R262L . . . . .	772
TAMTRON X7R302H. . . . .	774
TAMTRON X7R422H. . . . .	776
TAMTRON Y5U153U . . . . .	778
TAMTRON Y5V153H . . . . .	780

TAMTRON Z5U103H . . . . .	782
TAMTRON Z5U502L . . . . .	784
TAMTRON Z5U652H . . . . .	786
<b>DISPERSING AGENTS . . . . .</b>	<b>788</b>
<b>R.T. Vanderbilt. . . . .</b>	<b>788</b>
DARVAN C—Ammonium Dispersing Agent for Ceramic Bodies . . . . .	788
DARVAN No. 7—A Dispersing Agent for Ceramic Bodies . . . . .	788
DARVAN 82-1A—Ammonium Dispersing Agent for Ceramic Bodies . . . . .	789
DARVAN 811—Organic Sodium Dispersing Agents for Ceramic Bodies and Glazes. . . . .	790
DARVAN 811D—Organic Sodium Dispersing Agent in Dry Form. . . . .	790
<b>ELECTRONIC CERAMICS REAGENTS . . . . .</b>	<b>791</b>
<b>J.T. Baker . . . . .</b>	<b>791</b>
Antimony Trioxide . . . . .	791
Barium Carbonate . . . . .	791
Bismuth Trioxide . . . . .	792
Calcium Carbonate . . . . .	793
Chromium Sesquioxide. . . . .	794
Cobalt Oxide . . . . .	794
Cupric Carbonate . . . . .	796
Cupric Oxide . . . . .	796
Magnesium Carbonate . . . . .	797
Magnesium Oxide . . . . .	798
Manganese Dioxide . . . . .	798
Manganese Sesquioxide. . . . .	799
Manganous Carbonate . . . . .	800
Nickel Carbonate. . . . .	800
Nickel Oxide . . . . .	801
Nickel Oxide (Green) . . . . .	801
<b>Kali-Chemie . . . . .</b>	<b>802</b>
Barium Carbonate High Purity—Grade L500 (Produced by SABED SpA) . . . . .	802
Barium Carbonate High Purity—Grade N200 (Produced by SABED SpA) . . . . .	802
Barium Carbonate High Purity—Grade VL600 (Produced by SABED SpA) . . . . .	802
<b>GLAZES . . . . .</b>	<b>803</b>
<b>Degussa . . . . .</b>	<b>803</b>
Ceramic Glazes for Firing at High Temperatures—K & G Series. . . . .	803
Ceramic Glazes for Firing at 920°-980°C—A & M Series . . . . .	805
Transparent Glazes for Firing at 920°-980°C—C Series . . . . .	812
<b>M&amp;T Chemicals. . . . .</b>	<b>813</b>
Bright, Opaque Glazes for Two-Fire Sanitary Ware and Refire . . . . .	813
Bright, Opaque Glazes for Two-Fire Wall Tile and Art Ware. . . . .	814
Colored Glazes for Many Applications. . . . .	815
Fast Fire Glazes for Wall Tire. . . . .	817
Glazes for Vitreous Porcelains . . . . .	818
Mat Opaque and Mat Fritted Glazes . . . . .	819
Opaque Glazes for One-Fire Wall Tile and Art Ware . . . . .	821
Opaque Glazes for Special Porcelains. . . . .	822
Opaque Glazes for Structural Material . . . . .	822
<b>GLAZE STAINS . . . . .</b>	<b>824</b>
<b>Degussa . . . . .</b>	<b>824</b>
Glaze Stains (Produced by HPC Produits Chimiques SA). . . . .	824
<b>Mobay Chemical . . . . .</b>	<b>826</b>
PEMCO Glaze Stains . . . . .	826

<b>Westwood Ceramic Supply</b> . . . . .	828
Glaze and Engobe Stains . . . . .	828
<b>PIEZO COMPOSITIONS</b> . . . . .	831
<b>B.M. Hi-Tech</b> . . . . .	831
Lead Zirconate Titanate and Sodium Potassium Niobate Compositions . . . . .	831
Piezoelectric 'HP' Ceramics . . . . .	833
Modified Lead Metaniobate Compositions . . . . .	834
<b>Channel Industries</b> . . . . .	835
Barium Titanate and Lead Titanate Lead Zirconate Piezoelectric Materials . . . . .	835
<b>Piezo Kinetics</b> . . . . .	837
Lead Metaniobate Ceramics . . . . .	837
Lead Zirconate Titanate Ceramics (PZT) . . . . .	838
<b>Ultrasonic Powders</b> . . . . .	839
Piezosonic Powders . . . . .	839
<b>REFRACTORY MATERIALS—CASTABLE, GUNNABLE AND RAMMING MIXES</b> . . . . .	841
<b>Babcock and Wilcox</b> . . . . .	841
Dense Castables . . . . .	841
Gunning Castables . . . . .	842
Insulating Castables . . . . .	843
Special Duty Castables . . . . .	845
<b>Corhart Refractories</b> . . . . .	847
CORHART A-782 High Alumina Tamp . . . . .	847
CORHART K-29 Ramming Mix . . . . .	847
CORHART K-500 Hot Patch . . . . .	849
<b>Corning Ceramics</b> . . . . .	849
ZIRCOA-CAST . . . . .	849
<b>Manville</b> . . . . .	850
Dense Monolithic Refractories . . . . .	850
Insulating Monolithic Refractories . . . . .	851
<b>Resco Products</b> . . . . .	853
Extreme Service Castables . . . . .	853
General Duty Castables . . . . .	854
Gunited Castables . . . . .	855
Insulating Castables . . . . .	858
Castables and Gunning Mixes . . . . .	860
<b>Thermo Materials</b> . . . . .	862
THERMO-SIL CASTABLE 120 . . . . .	862
ISOMOLDED THERMO-SIL KF . . . . .	863
THERMO-SIL CASTABLE TG . . . . .	864
<b>REFRACTORY MATERIALS—MORTARS</b> . . . . .	865
<b>Corhart Refractories</b> . . . . .	865
CORHART A-621 Alumina Mortar (Heat Set) . . . . .	865
CORHART A-779 Alumina Mortar (Air Set) . . . . .	865
CORHART RFG Refractory Mortar . . . . .	866
<b>Resco Products</b> . . . . .	867
Air Setting and Heat Setting Mortars . . . . .	867
<b>SEALING AND SOLDER GLASSES</b> . . . . .	869
<b>Owens-Illinois</b> . . . . .	869
Copper Sealing Glass EJ-3 . . . . .	869
Package Lid Sealant SG-200 . . . . .	869
Package Sealant CV-111 . . . . .	870
Package Sealant SG350 . . . . .	870
Package Sealant XS-1175MI . . . . .	871

Panel Sealant CV-455 . . . . .	871
Panel Sealant S-89415 . . . . .	872
Panel Sealant SG-100 . . . . .	872
Solder Glass SG-7 . . . . .	873
Solder Glass SG-67 . . . . .	873
Television Solder Glass CV-808HD . . . . .	874
Tubulation Sealant S-89417 . . . . .	874
<b>Schott Electronics</b> . . . . .	<b>875</b>
Sealing Glasses . . . . .	875
Intermediate Sealing Glasses . . . . .	879
Stable Solder Glasses . . . . .	879
Crystallizing Solder Glasses . . . . .	879
<b>Transene</b> . . . . .	<b>881</b>
Solder Glass Sealants . . . . .	881
Transene Glass Compositions for Electronic Applications . . . . .	881