

MARKETS AND PROFITABILITY

Market Analytics: Acrylic Acid and Super Absorbent Polymers - 2021

Global

August 2021



This Report was prepared by NexantECA, the Energy and Chemicals Advisory company ("NexantECA"). Except where specifically stated in this Report, the information contained herein is prepared on the basis of information that is publicly available and contains no confidential third party technical information to the best knowledge and belief of NexantECA. The information has not been independently verified or otherwise examined to determine its accuracy, completeness or financial feasibility. Neither NexantECA, Subscriber nor any person acting on behalf of either shall have any liabilities for any loss or damage arising from or connected to the use of any information contained in this Report. NexantECA does not represent or warrant that any assumed conditions will come to pass.

The Report is for Subscriber's internal use only and shall be kept strictly confidential. The Report should not be otherwise reproduced, distributed or used without first obtaining prior written consent by NexantECA. Each Subscriber agrees to use reasonable effort to protect the confidential nature of the Report.

Copyright © by NexantECA (BV) Ltd. 2021. All rights reserved.



Contents

1	Executive Summary	1
1.1	Acrylic Acid	1
1.2	Super Absorbent Polymers	8
2	The Propylene and Derivatives Industry.....	15
2.1	Current Performance of the Propylene Market	15
2.1.1	Consumption	15
2.1.2	Supply	19
2.1.3	Supply, Demand and Trade	22
2.2	Sustainability	23
2.3	Acrylic Acid Chain	26
2.3.1	Acrylic Acid	26
2.3.2	Super Absorbent Polymers	26
2.3.3	Acrylates Esters	27
3	Market Coverage	28
4	Acrylic Acid.....	29
4.1	Global	29
4.1.1	Key Developments	29
4.1.2	Consumption	29
4.1.2.1	Acrylate Esters	30
4.1.2.2	Super Absorbent Polymers	31
4.1.2.3	Detergents, Flocculants, Others	32
4.1.3	Supply	34
4.1.4	Supply, Demand and Trade	36
4.2	North America	38
4.2.1	Key Developments	38
4.2.2	Consumption	38
4.2.3	Supply	41
4.2.4	Supply, Demand and Trade	44
4.3	South America.....	47
4.3.1	Key Developments	47
4.3.2	Consumption	47
4.3.3	Supply	50
4.3.4	Supply, Demand and Trade	52
4.4	Western Europe	54
4.4.1	Key Developments	54
4.4.2	Consumption	54
4.4.3	Supply	57
4.4.4	Supply, Demand and Trade	60
4.5	Central Europe	62
4.5.1	Key Developments	62



4.5.2	Consumption	62
4.5.3	Supply	64
4.5.4	Supply, Demand and Trade	65
4.6	Eastern Europe	66
4.6.1	Key Developments	66
4.6.2	Consumption	66
4.6.2.1	Russia	66
4.6.2.2	Other Eastern Europe	67
4.6.3	Supply	68
4.6.3.1	Russia	68
4.6.3.2	Other Eastern Europe	69
4.6.4	Supply, Demand and Trade	69
4.6.4.1	Russia	69
4.6.4.2	Other Eastern Europe	70
4.7	Middle East.....	72
4.7.1	Key Developments	72
4.7.2	Consumption	72
4.7.3	Supply	74
4.7.4	Supply, Demand and Trade	76
4.8	Africa	77
4.8.1	Key Developments	77
4.8.2	Consumption	77
4.8.3	Supply	79
4.8.4	Supply, Demand and Trade	80
5	Super Absorbent Polymers	107
5.1	Global	107
5.1.1	Key Developments	107
5.1.2	Consumption	107
5.1.2.1	Hygiene Products.....	109
5.1.2.2	Other Uses	110
5.1.3	Supply	113
5.1.4	Supply, Demand and Trade	115
5.2	North America	117
5.2.1	Key Developments	117
5.2.2	Consumption	117
5.2.3	Supply	120
5.2.4	Supply, Demand and Trade	121
5.3	South America.....	124
5.3.1	Key Developments	124
5.3.2	Consumption	124
5.3.3	Supply	126
5.3.4	Supply, Demand and Trade	128
5.4	Western Europe	129
5.4.1	Key Developments	129



5.4.2	Consumption	129
5.4.3	Supply	132
5.4.4	Supply, Demand and Trade	134
5.5	Central Europe	135
5.5.1	Key Developments	135
5.5.2	Consumption	135
5.5.3	Supply	136
5.5.4	Supply, Demand and Trade	137
5.6	Eastern Europe	138
5.6.1	Key Developments	138
5.6.2	Consumption	138
5.6.2.1	Russia	138
5.6.2.2	Other Eastern Europe	139
5.6.3	Supply	141
5.6.3.1	Russia	141
5.6.3.2	Other Eastern Europe	141
5.6.4	Supply, Demand and Trade	141
5.6.4.1	Russia	141
5.6.4.2	Other Eastern Europe	143
5.7	Middle East.....	145
5.7.1	Key Developments	145
5.7.2	Consumption	145
5.7.3	Supply	147
5.7.4	Supply, Demand and Trade	149
5.8	Africa	151
5.8.1	Key Developments	151
5.8.2	Consumption	151
5.8.3	Supply	153
5.8.4	Supply, Demand and Trade	154

Appendices

A	Methodology	175
A.1	Market Dynamics Forecasting Methodology	175
A.1.1	Capacity Availability and Forecasting	175
A.1.2	End-Use Consumption Forecasting	175
A.1.2.1	End-Use Sector Growth	176
A.1.2.2	Penetration (New Application Growth).....	176
A.1.2.3	Downgauging and Recycling	177
A.1.2.4	Chain Inventory	177
A.1.2.5	Short-term Influences.....	177
A.1.2.6	Monomer Consumption Forecasting.....	177
B	Acrylic Acid Value Chain – Technology.....	180
B.1	Propylene	180
B.1.1	Technology.....	180



B.2.2	Petrochemical-Based Acrylic Acid	184
B.2.3	Alternative and Bio-based Routes to Acrylic Acid.....	186
B.3.1.1	Solution Polymerization	187
B.3.1.2	Suspension Polymerization.....	187

Figures

Figure 1	Global Propylene Demand, 2020-e	18
Figure 2	Global GDP Growth vs Propylene Consumption Growth.....	18
Figure 3	Global Combined Propylene Consumption	18
Figure 4	Regional Propylene Capacity	21
Figure 5	Global Propylene Production by Process	21
Figure 6	Regional Propylene Capacity Addition	21
Figure 7	Global Propylene Supply and Demand	22
Figure 8	Global Polyolefin Consumption and Recycling.....	24
Figure 9	Global PET Consumption and Recycling	25
Figure 10	Global Acrylic Acid Consumption by End-Use, 2020-e	32
Figure 11	Global GDP Growth vs Acrylic Acid by Region	32
Figure 12	Global Acrylic Acid Consumption by Region	33
Figure 13	Global Acrylic Acid Capacity Share by Marketer in 2020-e.....	35
Figure 14	Global Acrylic Acid Capacity Addition	35
Figure 15	Global Acrylic Acid Capacity.....	35
Figure 16	Global Acrylic Acid Supply and Demand	37
Figure 17	Global Acrylic Acid Net Exports (Imports)	37
Figure 18	North America Acrylic Acid Demand, 2020-e	40
Figure 19	Location of Acrylic Acid Plants in North America	43
Figure 20	North America Acrylic Acid Supply, Demand and Trade.....	45
Figure 21	United States Acrylic Acid Supply, Demand and Trade	46
Figure 22	South America Acrylic Acid Demand, 2020-e	49
Figure 23	Location of Acrylic Acid Plants in South America.....	51
Figure 24	South America Acrylic Acid Supply, Demand and Trade	53
Figure 25	Western Europe Acrylic Acid Demand, 2020-e.....	56
Figure 26	Location of Acrylic Acid Plants in Western Europe	59
Figure 27	Western Europe Acrylic Acid Supply, Demand and Trade.....	61
Figure 28	Central Europe Acrylic Acid Consumption, 2020-e	63
Figure 29	Location of Acrylic Acid Plants in Central Europe	64
Figure 30	Central Europe Acrylic Acid Supply, Demand and Trade	65
Figure 31	Russia Acrylic Acid Consumption, 2020-e	67
Figure 32	Location of Acrylic Acid Plants in Eastern Europe	68
Figure 33	Russia Acrylic Acid Supply, Demand and Trade.....	70
Figure 34	Total Eastern Europe Acrylic Acid Supply, Demand and Trade.....	71
Figure 35	Middle East Acrylic Acid Demand, 2020-e	73
Figure 36	Location of Acrylic Acid Plants in the Middle East	75
Figure 37	Middle East Acrylic Acid Supply, Demand and Trade	76
Figure 38	Africa Acrylic Acid Demand, 2020-e	78



Figure 39	Location of Acrylic Acid Plants in Africa	79
Figure 40	Africa Acrylic Acid Supply, Demand and Trade.....	80
Figure 41	Asia Pacific Acrylic Acid Demand, 2020-e	91
Figure 42	Location of Acrylic Acid Plants in China	99
Figure 43	Location of Acrylic Acid Plants in Japan and South Korea	100
Figure 44	Location of Acrylic Acid Plants in South-East Asia	101
Figure 45	Location of Acrylic Acid Plants in India.....	101
Figure 46	Asia Pacific Acrylic Acid Supply, Demand and Trade	105
Figure 47	China Acrylic Acid Supply, Demand and Trade	106
Figure 48	Global Super Absorbent Polymer Demand by End-Use, 2020-e	111
Figure 49	Global GDP Growth vs Super Absorbent Polymer	111
Figure 50	Global Super Absorbent Polymer Consumption by Region	112
Figure 51	Global Super Absorbent Polymers Capacity Share by Marketer in 2020-e	114
Figure 52	Global Super Absorbent Polymers Capacity Addition	114
Figure 53	Global Super Absorbent Polymers Capacity	114
Figure 54	Global Super Absorbent Polymers Supply and Demand	116
Figure 55	Global Super Absorbent Polymers Net Exports (Imports).....	116
Figure 56	North America Super Absorbent Polymers Demand, 2020-e	119
Figure 57	Location of Super Absorbent Polymers Plants in North America.....	121
Figure 58	North America Super Absorbent Polymers Supply, Demand and Trade	122
Figure 59	United States Super Absorbent Polymers Supply, Demand and Trade	123
Figure 60	South America Super Absorbent Polymers Demand, 2020-e	125
Figure 61	Location of Super Absorbent Polymers Plants in South America	127
Figure 62	South America Super Absorbent Polymers Supply, Demand and Trade	128
Figure 63	Western Europe Super Absorbent Polymers Demand, 2020-e	131
Figure 64	Location of Super Absorbent Polymers Plants in Western Europe.....	133
Figure 65	Western Europe Super Absorbent Polymers Supply, Demand and Trade	134
Figure 66	Central Europe Super Absorbent Polymers Consumption, 2020-e	136
Figure 67	Central Europe Super Absorbent Polymers Supply, Demand and Trade	137
Figure 68	Russia Super Absorbent Polymers Consumption, 2020-e.....	139
Figure 69	Other Eastern Europe Super Absorbent Polymers Consumption, 2020-e.....	140
Figure 70	Russia Super Absorbent Polymers Supply, Demand and Trade	142
Figure 71	Other Eastern Europe Super Absorbent Polymers Supply, Demand and Trade	143
Figure 72	Total Eastern Europe Super Absorbent Polymers Supply, Demand and Trade	144
Figure 73	Middle East Super Absorbent Polymers Demand, 2020-e.....	146
Figure 74	Location of Super Absorbent Polymers Plants in the Middle East	148
Figure 75	Middle East Super Absorbent Polymers Supply, Demand and Trade	150
Figure 76	Africa Super Absorbent Polymers Demand, 2020-e	152
Figure 77	Africa Super Absorbent Polymers Supply, Demand and Trade	154
Figure 78	Asia Pacific Super Absorbent Polymers Demand, 2020-e.....	161
Figure 79	Location of Super Absorbent Polymers Plants in China	168
Figure 80	Location of Super Absorbent Polymers Plants in Japan and South Korea.....	169
Figure 81	Location of Super Absorbent Polymers Plants in South-East Asia	169
Figure 82	Asia Pacific Super Absorbent Polymers Supply, Demand and Trade	172



Figure 83	China Super Absorbent Polymers Supply, Demand and Trade	173
Figure 84	End-Use Consumption Drivers	176
Figure 85	Monomer Consumption Drivers.....	178
Figure 86	Trade Considerations	179
Figure 87	Global Olefins Production by Process 2013.....	181
Figure 88	Global Propylene Capacity Additions	182
Figure 89	Petrochemical-based Routes to Acrylic Acid.....	185
Figure 90	Generic Flow Diagram for Solution Polymerization.....	187
Figure 91	Generic Flow Diagram for Suspension Polymerization	188

Tables

Table 1	Global Acrylic Acid Consumption by End-Use	32
Table 2	Global Acrylic Acid Consumption by Region	33
Table 3	Global Acrylic Acid Supply and Demand	37
Table 4	North America Acrylic Acid Consumption by End-Use.....	40
Table 5	North America Acrylic Acid Consumption by Country	40
Table 6	Acrylic Acid Capacity in North America	42
Table 7	North America Acrylic Acid Supply, Demand and Trade.....	45
Table 8	United States Acrylic Acid Supply, Demand and Trade	46
Table 9	South America Acrylic Acid Consumption by End-Use	49
Table 10	South America Acrylic Acid Consumption by Country	49
Table 11	Acrylic Acid Capacity in South America	50
Table 12	South America Acrylic Acid Supply, Demand and Trade	53
Table 13	Western Europe Acrylic Acid Consumption by End-Use.....	56
Table 14	Acrylic Acid Capacity in Western Europe	58
Table 15	Western Europe Acrylic Acid Supply, Demand and Trade.....	61
Table 16	Central Europe Acrylic Acid Consumption by End-Use	63
Table 17	Acrylic Acid Capacity in Central Europe.....	64
Table 18	Central Europe Acrylic Acid Supply, Demand and Trade	65
Table 19	Russia Acrylic Acid Consumption by End-Use.....	67
Table 20	Acrylic Acid Capacity in Russia	68
Table 21	Russia Acrylic Acid Supply, Demand and Trade.....	70
Table 22	Total Eastern Europe Acrylic Acid Supply, Demand and Trade.....	71
Table 23	Middle East Acrylic Acid Consumption by End-Use	73
Table 24	Middle East Acrylic Acid Consumption by Country	74
Table 25	Acrylic Acid Capacity in the Middle East	75
Table 26	Middle East Acrylic Acid Supply, Demand and Trade	76
Table 27	Africa Acrylic Acid Consumption by End-Use.....	78
Table 28	Africa Acrylic Acid Consumption by Country	78
Table 29	Acrylic Acid Capacity in Africa.....	79
Table 30	Africa Acrylic Acid Supply, Demand and Trade.....	80
Table 31	Asia Pacific Acrylic Acid Consumption by End-Use	91
Table 32	Asia Pacific Acrylic Acid Consumption by Country	91
Table 33	Acrylic Acid Capacity in Asia Pacific	97



Table 34	Asia Pacific Acrylic Acid Supply, Demand and Trade	105
Table 35	China Acrylic Acid Supply, Demand and Trade	106
Table 36	Global Super Absorbent Polymer Consumption	111
Table 37	Global Super Absorbent Polymer Consumption by Region	112
Table 38	Global Super Absorbent Polymers Supply and Demand	116
Table 39	North America Super Absorbent Polymers Consumption by Country	119
Table 40	Super Absorbent Polymers Capacity in North America	120
Table 41	North America Super Absorbent Polymers Supply, Demand and Trade	122
Table 42	United States Super Absorbent Polymers Supply, Demand and Trade	123
Table 43	South America Super Absorbent Polymers Consumption by Country	125
Table 44	Super Absorbent Polymers Capacity in South America.....	126
Table 45	South America Super Absorbent Polymers Supply, Demand and Trade	128
Table 46	Western Europe Super Absorbent Polymers Consumption	131
Table 47	Super Absorbent Polymers Capacity in Western Europe	132
Table 48	Western Europe Super Absorbent Polymers Supply, Demand and Trade	134
Table 49	Central Europe Super Absorbent Polymers Consumption.....	136
Table 50	Central Europe Super Absorbent Polymers Supply, Demand and Trade	137
Table 51	Russia Super Absorbent Polymers Consumption	139
Table 52	Other Eastern Europe Super Absorbent Polymers Consumption	140
Table 53	Russia Super Absorbent Polymers Supply, Demand and Trade	142
Table 54	Other Eastern Europe Super Absorbent Polymers Supply, Demand and Trade	143
Table 55	Total Eastern Europe Super Absorbent Polymers Supply, Demand and Trade	144
Table 56	Middle East Super Absorbent Polymers Consumption by Country.....	146
Table 57	Super Absorbent Polymers Capacity in the Middle East.....	148
Table 58	Middle East Super Absorbent Polymers Supply, Demand and Trade	150
Table 59	Africa Super Absorbent Polymers Consumption by Country	152
Table 60	Africa Super Absorbent Polymers Supply, Demand and Trade	154
Table 61	Asia Pacific Super Absorbent Polymers Consumption by Country	161
Table 62	Super Absorbent Polymers Capacity in Asia Pacific	167
Table 63	Asia Pacific Super Absorbent Polymers Supply, Demand and Trade	172
Table 64	China Super Absorbent Polymers Supply, Demand and Trade.....	173