

# Aluminum Electrolytic Capacitors:

## World Markets, Technologies & Forecasts: 2019-2023



Paumanok Publications, Inc.  
Industrial Market Research (IMR)  
ONE CITY CENTER  
DURHAM, NC 27701  
Cary, NC 27519 USA  
(919) 468-0384 Main Office  
info@paumanokgroup.com  
www.paumanokgroup.com

©1988-2019 Paumanok Publications, Inc., includes the Industrial Market Research Division for Capacitors, Resistors, Inductors and Circuit Protection Devices; The Mergers & Acquisitions Due Diligence Division; The Single Client Consulting Division; The On-Site Presentation/Seminar and Events Division; The Monthly Report (MLCC, Chip Resistor and Tantalum Capacitor Supply Chain Monitoring); The Specialty Markets (Defense, Medical, Mining and Automotive Power); and 100% Ownership of Passive Component Industry Magazine.



Paumanok Publications  
*Industrial Strength Market Research*

Copyright ©2019 Paumanok Publications, Inc.

Published by: Paumanok Publications, Inc.

Publication Date: February 2019

ISBN # 1-893211-11-8 (2019)

Pages: 219

Price: \$3,750.00

Paumanok Publications, Inc.

ONE CITY CENTER- 5<sup>TH</sup> FLOOR

DURHAM, NC 27701

[www.paumanokgroup.com](http://www.paumanokgroup.com)

Customer Service: (919) 468-0384

Email: [info@paumanokgroup.com](mailto:info@paumanokgroup.com)

It is our mission to empower manufacturers, distributors, OEM, EMS, financial institutions and governments with unbiased market research to protect their assets, build their wealth and prosper in good times and bad.

All rights reserved. Permission to reprint materials is expressly prohibited without the prior written consent of Paumanok Publications, Inc. The accuracy of the data used is deemed reliable but not guaranteed. There is no assurance that past performance will be repeated in the future.



Paumanok Publications  
*Industrial Strength Market Research*

# Aluminum Electrolytic Capacitors: World Markets, Technologies & Forecasts: 2019-2023

## Table of Contents:

<b>1.0 EXECUTIVE SUMMARY:</b> .....	<b>22</b>
1.1 Key Findings of This Report: .....	22
1.2 Aluminum Electrolytic Capacitors: Value and Volume of Global Consumption: FY 2019- FY 2020 Forecast:.....	22
1.3 Impact of US China Trade War On Global Sales of Aluminum Electrolytic Capacitors: FY 2018-FY 2019 Forecast: .....	22
1.4 Aluminum Electrolytic Capacitors and Their Place In The Larger Energy Storage Market: .....	23
1.5 The Value Proposition of Aluminum Electrolytic Capacitors To The Customer: .....	23
1.6 Sensitivity of The Supply Chain For Aluminum Electrolytic Capacitors (Risk Factors):.....	23
1.8 Importance of The Television Set Industry To The Aluminum Electrolytic Capacitor Market:.....	24
1.9 Redundant Nature of Consumer AV Products In The Wake of Smartphones: Impact on Aluminum Capacitor Supply Chain: .....	24
1.10 Opportunities in Large Can Electrolytic Capacitors:.....	24
1.11 Opportunities in Conductive Polymer Aluminum Capacitors: .....	25
1.12 Research and Development Trends and Directions: FY 2019-2023:.....	25
1.12 (A) 105 Degree C, Long Life Development (Snap Mount): .....	25
1.12 (B) - 125 C, Low ESR Chip Type:.....	25
1.12 (C ) - 135 C, Low ESR Chip Type: .....	25
1.12 (D) High Q-Low Impedence Capacitor Developments: .....	25
1.12 (E) 25 Low ESR and Ultra-Low ESR Solid Polymer Developments:.....	26
1.12 (F) Hybrid Polymer Capacitor Developments: .....	26
1.12 (H) High Voltage Aluminum Capacitor Designs 800 VAC: .....	26
1.12 (I) Other Developments (Halogen Free Designs, Low Profile Chips, Flash, Transient ESD Protection, Anti-Vibration, 800 V Electrolytes) .....	26
1.12 (J) 800 Volt Electrolyte Development: .....	26
1.13 Aluminum Electrolytic Capacitor Market Trends and Directions: FY 2019-2023:.....	28
1.13 Positive Market Indicators: .....	28
1.14 Negative Market Indicators: .....	28
1.15 Short-Term Outlook To 2023:.....	28



Paumanok Publications  
Industrial Strength Market Research

1.16 Changing View on Passive Component Unit Sales to 2023:.....	29
1.17 CRL Annual Review and Forecast: Passive Electronic Component: FY 2018- FY 2019 Forecasts.....	29
1.18 Key Passive Products Growth in USD Annualized year-On Year: FDY 2018-FY 2019 .....	29
1.18 Regional Growth in FY 2018 and FY 2019: .....	30
1.19 End Use Segment Growth in FY 2018 and FY 2019.....	30
1.19 Capacity Expansion Estimates .....	31
1.20 Price Adjustments:.....	31
1.21Who paid the most for parts in FY 2018 and FY 2019 .....	32
1.22 Strategies for Managing Short Supply Scenarios- .....	32
1.23 How MLCC Shortages Might Impact Demand For Other Dielectrics: FY 2019-2023.....	33
1.16 Using SMD Aluminum Electrolytic Capacitors To Fill The Gaps in FY 2019.....	35
1.17 Overlap Between MLCC and Aluminum Capacitors by Case Size.....	35
1.18 Unexpected Growth in Industrial Automation (F4) .....	37
1.19 Industry 4.0- Industrial Automation Driving Large Component Demand.....	37
1.20 Snap-Mount 105 C Product Development for Transportation in FY 2019.....	37
1.21 Chip 135 C Product Development for Transportation in FY 2019.....	38
<b>2.0 ALUMINUM ELECTROLYTIC CAPACITORS: WORLD MARKET OVERVIEW: FY 2019.....</b>	<b>38</b>
2.1 Introduction and Market Overview: FY 2019.....	38
2.2 Current Market Conditions in FY 2019.....	39
2.3 Fiscal Year 2019 Estimates For Global Consumption Of Aluminum Capacitors:.....	39
2.4 About the Author:.....	40
2.5 Scope of Report Coverage: .....	40
2.6 Fixed Capacitors and Their Respective Market Valuations and Sub-Categories: FY 2019 .....	40
2.7 Fixed Capacitors and Their Respective Sub-Categories: FY 2019 .....	41
2.8 Methodology Employed: .....	42
2.9 The Paumanok Research Methodology:.....	43
2.10 Government Data Collection and Resources: .....	43
2.11 Secondary Published Sources: .....	44
2.12 Primary Intelligence Gathering:.....	44
2.13 Aluminum Electrolytic Capacitor Supply Chain:.....	45
2.14 Mining of Raw Materials for Aluminum Electrolytic Capacitors: .....	46
2.15 Raw Materials Processing for Aluminum Electrolytic Capacitors: .....	46
2.16 Aluminum Electrolytic Capacitors: Component Manufacturing:.....	46
2.17 Aluminum Electrolytic Capacitors and Component Distribution: .....	46
2.18 Aluminum Electrolytic Capacitors and End-Market Consumption: .....	47
2.19 Aluminum Electrolytic Capacitors: Recycling of Critical Materials:.....	47
2.20 Financial Considerations With Respect To This Report:.....	48
2.21 The Fiscal Year Ending March 31, 2019 .....	48



Paumanok Publications  
Industrial Strength Market Research

2.22 Volume, Value and Pricing Data:.....	49
2.23 <i>Technical-Economic Maxims Related To Aluminum Electrolytic Capacitors:</i> .....	49
2.23.1 The Two Technical Economic Maxims Associated with Aluminum Electrolytic Capacitors:.....	50
<b>3.0 ALUMINUM CAPACITOR TECHNOLOGY:</b> .....	<b>51</b>
3.1 Introduction: .....	51
3.2 Aluminum Electrolytic Capacitor Component Configurations:.....	51
3.3 Radial Leaded Aluminum Capacitors .....	52
3.4 Vertical Chip Capacitors (V-Chip).....	52
3.5 Horizontal Chip Capacitors (H-Chip).....	53
3.6 Axial Leaded Aluminum Capacitors .....	53
3.7 Screw Terminal {Large Can}.....	53
3.8 Snap-In/Snap-Mount Aluminum Capacitors.....	54
3.9 Specialty Aluminum Capacitor Types and Configurations.....	55
3.10 <i>Changes in Demand For Aluminum Electrolytic Capacitors By Configuration Over Time: FY 2019</i> .....	57
3.11 <i>Revenue Analysis for The World's Top Producers of Aluminum Capacitors and Forecasts for FY 2016</i> .....	58
<b>4.0 ALUMINUM ELECTROLYTIC CAPACITORS: GLOBAL MARKETS: FY 2019</b> .....	<b>61</b>
4.1 GLOBAL VALUE, VOLUME AND PRICING: FY 2019 .....	61
4.2 Historical Aluminum Electrolytic Capacitor Consumption Value: FY 2003-2018 and FY 2019.....	61
4.3 Historical Aluminum Electrolytic Capacitor Consumption Volume: FY 2003-2019.....	63
4.4 Historical Average Unit Pricing Trend For Aluminum Electrolytic Capacitors: FY 2003-2019.....	65
<b>5.0 ALUMINUM ELECTROLYTIC CAPACITORS: DEMAND BY END-USE MARKET SEGMENT: FY 2019</b> .....	<b>67</b>
5.1 Aluminum Electrolytic Capacitor Consumption By End-Use Market Segment: FY 2019 .....	67
Competitive Positioning by End-Use Market Segment: FY 2019-2023.....	69
5.1.1 Consumer Audio and Video Imaging and Home Theatre Electronics: .....	69
5.1.2 Computer and Peripheral Markets: .....	69
5.1.3 Industrial, Power T&D and Lighting: .....	70
5.1.4 Automotive:.....	70
5.1.5 Communications Infrastructure: .....	70
5.1.6 Specialty Markets: .....	70
<b>6.0 ALUMINUM ELECTROLYTIC CAPACITORS: DEMAND BY WORLD REGION: FY 2019</b> .....	<b>73</b>
6.1 Global Value of Aluminum Electrolytic Capacitor Consumption By World Region: FY 2019.....	73
6.2 Key Countries and Local markets Consuming Aluminum Electrolytic Capacitors in FY 2019: .....	75
6.2.1 Greater China: .....	75
6.2.2 Singapore, Korea and Thailand: .....	75
6.2.3 The Complex European Market.....	75



6.2.4 USA, Mexico & Brazil.....	76
<b>6.3 Shifting Global Markets: Forecasts for Aluminum Capacitor Consumption By Key Consuming Country: FY 2019 and Trends.....</b>	<b>78</b>
6.3.2 German Market Outlook: for Aluminum Electrolytic Capacitors: FY 2019.....	80
6.3.3 Singapore Market Outlook: for Aluminum Electrolytic Capacitors: FY 2019.....	80
6.3.4 USA Market Outlook: for Aluminum Electrolytic Capacitors: FY 2019.....	80
6.3.5 Mexico Market Outlook: for Aluminum Electrolytic Capacitors: FY 2019.....	80
6.3.6 Holland Market Outlook Aluminum Electrolytic Capacitors: FY 2019.....	80
6.3.7 Thailand Market Outlook: for Aluminum Electrolytic Capacitors: FY 2019.....	80
6.3.8 Korea Market Outlook: for Aluminum Electrolytic Capacitors: FY 2019.....	81
6.3.9 Brazil Market Outlook: for Aluminum Electrolytic Capacitors: FY 2019.....	81
<b>7.0 ALUMINUM ELECTROLYTIC CAPACITORS: LEAD TIME TRENDS: FY 2019.....</b>	<b>83</b>
7.1 Lead Time Trends For Aluminum Electrolytic Capacitors: FY 2019.....	83
7.2 Aluminum Capacitor Lead Times in Weeks: Overall Trend by Month To January 2019.....	83
7.3 Aluminum Electrolytic Capacitors: Lead Times by Type ( In Weeks) January 2013- January 2019.....	84
7.4.Measurable Lead Time Updates: FY 2019.....	85
7.4.1 Axial Leaded Aluminum Electrolytic:.....	85
7.4.2 EDLC Capacitors:.....	85
7.4.3 Vertical Chip Aluminum Electrolytic:.....	85
7.4.4 Organic Horizontal Chip Aluminum Electrolytic:.....	85
7.4.5 Radial Leaded Aluminum Electrolytic:.....	85
7.4.6 Snap Mount Aluminum Electrolytic:.....	86
7.4.7 Screw Terminal (Large Can) Aluminum Electrolytic:.....	86
<b>8.0 ALUMINUM ELECTROLYTIC CAPACITORS: MARKET SHARES: FY 2019.....</b>	<b>87</b>
<b>8.1 Competitive Environment in Aluminum Capacitors: FY 2019.....</b>	<b>87</b>
<b>8.2 Aluminum Capacitor Manufacturers: FY 2019 Sales &amp; Market Shares.....</b>	<b>87</b>
8.3.1 Nippon Chemi-Con: Revenue and Market Share Analysis:.....	89
8.3.2 Nichicon: Revenue and Market Share Analysis:.....	89
8.3.3 Rubycon: Revenue and Market Share Analysis:.....	89
8.3.4 Aihua (Aishi): Revenue and Market Share Analysis.....	89
8.3.5 Panasonic: Revenue and Market Share Analysis:.....	89
8.3.6 Nantong Jianghai: Revenue and Market Share Analysis:.....	89
8.3.7 Lelon: Revenue and Market Share Analysis:.....	89
8.3.8 SamYoung Revenue and Market Share Analysis:.....	90
8.3.9 ManYue: Revenue and Market Share Analysis:.....	90
8.3.10 Capxon Company: Revenue and Market Share Analysis:.....	90
8.3.11 TDK- EPCOS: Revenue and Market Share Analysis:.....	90



8.3.12 Elna Company: Revenue and Market Share Analysis:.....	90
8.3.13 Taiwan Chinsan: Revenue and Market Share Analysis: .....	90
8.3.14 Vishay Intertechnology- BCC Operations: Revenue and Market Share Analysis .....	91
8.3.15 KEMET (RIFA AB).....	91
8.4 Aluminum Electrolytic Capacitor Manufacturers: Factories By Country .....	92
8.5 Four Countries Produce The Majority of Aluminum Capacitors: FY 2019.....	93
<b>9.0 FORECASTS: ALUMINUM ELECTROLYTIC CAPACITORS: GLOBAL MARKET FORECASTS TO 2023 .....</b>	<b>93</b>
<i>9.1 Aluminum Electrolytic Capacitors: 2019-2023 Outlook.....</i>	<i>93</i>
9.2 Global Value Forecast for Aluminum Electrolytic Capacitors: FY 2019 to FY 2023 .....	93
9.3 Competition and Pricing Outlook: FY 2019 to FY 2023.....	93
9.4 Changing Product Mix: FY 2019-FY 2023.....	93
9.5 Changing End-Markets: FY 2019-FY 2023 .....	94
9.6 Aluminum Electrolytic Capacitor Unit Forecasts: 2019-2023.....	94
9.7 Aluminum Electrolytic Capacitors: Global Dollar Forecasts: 2019-2023:.....	96
9.8 Aluminum Electrolytic Capacitor Pricing Forecasts: 2019-2023.....	98
9.9 Aluminum Electrolytic Consumption Value By End-Use Market Segment Forecasts: 2019-2023.....	100
9.10 Forecasts: Forecasts By End-Use Market Segment: FY 2019-FY 2023 .....	102
9.10.1 Outlook for Aluminum Electrolytic Capacitors in Consumer Audio and Video Imaging: FY 2019-FY2023 .....	102
9.10.2 Outlook for Aluminum Electrolytic Capacitors in Personal Computers: FY 2019-FY 2023 .....	102
9.10.3 Outlook for Aluminum Electrolytic Capacitors in Industrial Electronics: FY 2019-FY 2023 .....	102
9.10.4 Outlook for Aluminum Electrolytic Capacitors in Automotive and Transportation Electronics: FY 2019-FY 2023.....	103
9.10.5 Outlook for Aluminum Electrolytic Capacitors in Telecommunications Infrastructure Electronics: FY 2019-FY 2023.....	103
9.10.6 Outlook for Aluminum Electrolytic Capacitors in Specialty Electronics: FY 2019-FY 2023.....	103
9.11 Aluminum Electrolytic Consumption Value By World Region Forecasts: 2019-2023.....	103
9.11.1 Chinese Market Outlook For Aluminum Electrolytic Capacitors: FY 2019-2023 .....	104
9.11.2 Europe Market Outlook For Aluminum Electrolytic Capacitors: FY 2019-2023 .....	104
9.11.3 Japan & Asia Market Outlook For Aluminum Electrolytic Capacitors: FY 2019-2023 .....	104
9.11.4 American Market Outlook For Aluminum Electrolytic Capacitors: FY 2019-2023 .....	105
<b>10.0 ALUMINUM ELECTROLYTIC CAPACITORS: MARKET OPPORTUNITIES: 2019-2023.....</b>	<b>106</b>
<i>10.1 Strategies of The Aluminum Capacitor Industry: 2019-2023.....</i>	<i>106</i>
10.1.1 Increasing The Throughput of Manufacturing.....	106
10.1.2 Multi-Level Electrolytic Etching Process:.....	106
10.1.3 Ultra-High Voltage Electrolytic Foil Developments and Improvements .....	106
10.1.4 Improvements in Electrolytic Foil Formation Technology: .....	106
10.1.5 Improvements in Electrolytic Capacitor Costs To Produce: .....	107
10.1.6 Aluminum Capacitor Industry Engineering Solutions for Specific Product Lines for FY 2020 .....	107
10.1.7 Snap-In 125 C Aluminum Capacitors for Automotive.....	107



10.1.8 Renewable Energy System Capacitors (550 V-5,000 Hours, 15/30 Years) .....	107
10.1.9 New Internal Structure and Aging Technique for Aluminum Capacitors .....	108
10.1.10 New V-Chip for Low Temperature Reflow Process.....	108
10.1.11 Reduction in The Liquid V-Chip Volume of Size .....	108
10.1.12 Semi-Solid Aluminum Electrolytic Capacitor Developments.....	108
10.1.13 Needle-Shaped Aluminum Electrolytic Capacitor Developments.....	109
10.1.14 Increasing Costs To Produce .....	109
<b>10.2 Technology Focus- 2019-2023.....</b>	<b>109</b>
10.2.1 Automotive and Transportation Electronics:.....	109
10.2.2 Machine Collaboration In Industrial Electronics .....	109
10.2.3 Roll-Out of 5G Infrastructure.....	110
10.2.4 Opportunities in Industrial, Power and Renewable Energy .....	110
<b>11.0 PRODUCER PROFILES: .....</b>	<b>111</b>
<b>AIHUA GROUP (AISHI) .....</b>	<b>111</b>
<i>Aihua Group: About This Company: .....</i>	<i>111</i>
<i>Aihua Group: Product Lines: Aishi Brand .....</i>	<i>111</i>
<i>Aihua Group: Aluminum Capacitor Product Configurations: .....</i>	<i>112</i>
<i>Aihua (Aishi): Revenue and Market Share Analysis .....</i>	<i>112</i>
<i>Manufacturing Facilities:.....</i>	<i>112</i>
Mianyang, Sichuan Factory:.....	112
Deyang, Sichuan Factory:.....	113
Ya' An, Sichuan Factory:.....	113
Yiyang, Hunan Factory: .....	113
Yiyang, Hunan 2 Factory:.....	113
Nantong, Jiangsu Factory: .....	113
Research & Development Taipei Factory:.....	113
<i>Aihua Group: Revenue Growth Trend:.....</i>	<i>115</i>
<i>Aihua Group: Revenue By World Region:.....</i>	<i>117</i>
<i>Aihua Group: Strengths:.....</i>	<i>118</i>
<i>Aihua Group: Latest Developments: .....</i>	<i>118</i>
<i>Aihua Group: Technology Achievements in Aluminum Capacitor Design:.....</i>	<i>118</i>
Conductive Polymer Capacitors at Aihua Group (Types PZ and PS):.....	118
NEW! LED Driver Capacitor-.....	118
UPDATE! High Frequency, Low Impedance Parts .....	118



Paumanok Publications  
Industrial Strength Market Research



<b>APAQ TECHNOLOGY.....</b>	<b>119</b>
<i>Apaq Technology Company Limited.....</i>	<i>119</i>
<i>APAQ: About This Company:.....</i>	<i>119</i>
<i>APAQ Revenue Growth Analysis:.....</i>	<i>119</i>
<i>APAQ: Additional Manufacturing:.....</i>	<i>120</i>
<i>APAQ: Technology Achievements in Aluminum Capacitor Design:.....</i>	<i>120</i>
<i>AP-CON Aluminum: Radial Leaded Solid Polymer Capacitor:.....</i>	<i>121</i>
<i>AP-Cap Molded Chip Solid Polymer Aluminum Capacitor:.....</i>	<i>121</i>
<i>APAQ: Aluminum Capacitor Production Capacity:.....</i>	<i>121</i>
<i>APAQ: Employees:.....</i>	<i>121</i>
<i>APAQ: Partner Companies:.....</i>	<i>121</i>
<b>CAPXON.....</b>	<b>122</b>
<i>CAPXON INTERNATIONAL ELECTRONIC CO., LTD. ....</i>	<i>122</i>
<i>Capxon: About This Company:.....</i>	<i>122</i>
<i>Capxon: Product Line:.....</i>	<i>123</i>
<i>Capxon: Aluminum Electrolytic Capacitor Revenues:.....</i>	<i>123</i>
<i>Capxon: Capacitor Revenues by World Region:.....</i>	<i>124</i>
<i>New Product Lines and Technology Direction at Capxon:.....</i>	<i>124</i>
<i>Developments in Snap Mount.....</i>	<i>124</i>
<b>CARLIT.....</b>	<b>124</b>
<i>Japan Carlit Company Limited.....</i>	<i>124</i>
<i>Japan Carlit: Company Description:.....</i>	<i>125</i>
<i>Carlit Holdings Chemicals Division.....</i>	<i>125</i>
<i>Japan Carlit: Electronic Industrial Minerals Division:.....</i>	<i>125</i>
<i>Japan Carlit: Conductive Polymer Materials:.....</i>	<i>125</i>
<i>Japan Carlit: Relationship With Rubycon:.....</i>	<i>126</i>
<i>Rubycon- Carlit Company Limited Joint Venture.....</i>	<i>126</i>
<i>PC-Con Molded Chip Conductive Polymer Aluminum Capacitors:.....</i>	<i>126</i>
<b>CHINSAN.....</b>	<b>127</b>
<i>Chinsan Electronic Group.....</i>	<i>127</i>
<i>Taiwan: Chinsan: Company Description:.....</i>	<i>127</i>



<i>Taiwan Chinsan: Revenue Analysis and Forecasts</i> .....	128
<i>Taiwan Chinsan: Production Facilities:</i> .....	129
<i>Taiwan Chinsan: Sales By End-Use Market Segment:</i> .....	129
<i>Taiwan Chinsan: Sales By Region:</i> .....	129
<i>Taiwan Chinsan: Aluminum Capacitor Products:</i> .....	129
<i>Taiwan Chinsan: Production Capacity By Product Line:</i> .....	129
<i>Taiwan Chinsan: Production Expansion:</i> .....	130
<i>Taiwan Chinsan: Polymer Aluminum Capacitor Lines:</i> .....	130
CS-Cap: Polymer Radial Lead Type .....	130
CS-Cap: Vertical Chip Type .....	130
<i>Taiwan Chinsan: Japan HITACHI Technology Supply.</i> .....	130
<i>Taiwan Chinsan: Manufacturing Locations:</i> .....	130
<i>Taiwan Chinsan targets growth in automotive, medical equipment and telecommunications</i> .....	130
<i>CIU CSCCA-40 Materials Development</i> .....	131
<b>CDE</b> .....	<b>132</b>
CORNELL-DUBILIER ELECTRONICS (INCLUDING YORK CAPACITOR) .....	132
<i>CDE: About This Company:</i> .....	132
<i>CDE: Capacitor Product Line:</i> .....	132
<i>CDE: Manufacturing Facilities:</i> .....	132
<i>CDE: Product and Market Assessment:</i> .....	133
<i>Cornell-Dubiler: Revenue Analysis:</i> .....	133
<b>ELNA (NOW TAIYO YUDEN)</b> .....	<b>133</b>
ELNA COMPANY LIMITED .....	133
<i>Elna: Company Status and Ownership (Taiyo Yuden Buys Elna)</i> .....	133
<i>Elna: Company Revenue Trend: FY 2012-FY 2015:</i> .....	133
<i>Revenues Reported by Elna/Taiyo Yuden</i> .....	134
<i>Elna: Employees:</i> .....	136
<i>Elna: Product Lines:</i> .....	136
<i>Elna: Aluminum Electrolytic Capacitor Product Line:</i> .....	136
<i>Elna: PV Series Conductive Polymer Aluminum Capacitor</i> .....	136
PVG Series: .....	136



PVX Series: .....	137
PV2 Series: .....	137
PVM Series: .....	137
PVH Series: .....	137
PVO Series: .....	137
Additional Notes (RYK Series) .....	137
<i>Elna: TANIN ELNA CO., LTD.</i> .....	138
<i>ELNA-SONIC SDN. BHD.</i> .....	138
<i>Elna Taiyo Yuden Announcement of Product Development</i> .....	138
<i>Elna New Product Developments</i> .....	138
Low ESR Hybrid Polymer, lead terminal type .....	138
Low ESR, 125°C, Hybrid Polymer, lead terminal type .....	138
105°C, 5000h/7000h V-Chip .....	138
125 C, Long Life, Low ESR V-Chip .....	138
<b>ENESOL</b> .....	<b>139</b>
ENESOL .....	139
<i>Enesol: About This Company:</i> .....	139
<i>Enesol: Business Relationship With Matsuki Polymer:</i> .....	139
<i>Enesol: Plant Capacity:</i> .....	140
<i>Enesol: Conductive Polymer Aluminum Products:</i> .....	140
Radial Leded Type: .....	140
SMD Type: .....	140
<i>Applications For EneCap™ Conductive Polymer Aluminum Capacitors:</i> .....	141
<b>FPCAP (NICHICON)</b> .....	<b>142</b>
FPCAP ELECTRONICS (SUZHOU) CO., LTD .....	142
<i>FPCap: Background:</i> .....	142
<i>FPCap: Product Line:</i> .....	142
<i>FPCap: Conductive Polymer Aluminum Product Types:</i> .....	143
Radial Leded Type (RE): .....	143
SMD Type (ME): .....	143
<i>FPCap: Target Markets:</i> .....	144
<i>FPCap: Ownership:</i> .....	144
<b>FUJICON</b> .....	<b>144</b>



<i>Fujicon Electric Co., Ltd.</i> .....	144
<i>Fujicon: About This Company:</i> .....	144
<i>Fujicon: Product Line:</i> .....	144
<i>Fujicon: Corporate History:</i> .....	145
<b>HITACHI AIC, INC. (HITACHI CHEMICAL)</b> .....	<b>145</b>
HITACHI AIC INC. (NOW PART OF HITACHI CHEMICAL).....	145
<i>UPDATED Hitachi AIC: About This Company:</i> .....	145
<i>Hitachi AIC (Hitachi Chemical): Revenue and Market Share Analysis:</i> .....	145
<i>Hitachi AIC: Employees:</i> .....	146
<i>Hitachi AIC: Main Products</i> .....	146
<i>Hitachi AIC: Factories:</i> .....	146
<i>Hitachi AIC: Recent Reorganization: 5</i> .....	146
<i>Hitachi AIC: Cooperation Strategy With Shinkobe Electric Machinery:</i> .....	147
<i>Hitachi AIC: Aluminum Capacitor Electrode Research and Development: Trends &amp; Directions:</i> .....	147
<i>Hitachi AIC: Aluminum Capacitor High Voltage Research and Development: Trends &amp; Directions:</i> .....	147
<i>Hitachi AIC/Hitachi Chemical New Product Development</i> .....	147
<b>ITELCOND</b> .....	<b>148</b>
ITELCOND S.R.L.....	148
<i>Itelcond: About This Company:</i> .....	149
<i>Itelcond: Aluminum Capacitor Product Lines:</i> .....	149
<i>Itelcond Capacitor: Sales Organization</i> .....	149
<i>Itelcond Capacitor: Product Development- High Reliability Energy Storage</i> .....	149
<b>JACKCON</b> .....	<b>150</b>
JACKCON CAPACITOR ELECTRONICS COMPANY LIMITED.....	150
<i>Jackcon: About This Company:</i> .....	150
<i>Jackcon: Employees:</i> .....	150
<i>Jackcon: Monthly Capacity:</i> .....	150
<i>Jackcon: Aluminum Electrolytic Product Line</i> .....	150
<i>Jackcon: Aluminum Electrolytic Product Line: New Product Development</i> .....	150
<b>JAMICON (KAIMEI)</b> .....	<b>151</b>



Paumanok Publications  
Industrial Strength Market Research

JAMICON ELECTRONICS CORPORATION.....	151
<i>Jamicon: About This Company:</i> .....	151
<i>Jamicon: Company Revenues:</i> .....	151
<i>Jamicon: Conductive Polymer Radial Leaded Designs:</i> .....	151
PS Type Radial Leaded Low ESR.....	151
PT Type Radial Leaded Super Low ESR.....	152
PH Type Radial Leaded Low ESR Capacitors.....	152
The PC Type Chip V-Chip Solid Polymer Aluminum Capacitor.....	152
The PF Type V-Chip with Super Low ESR .....	152
The PB Type V-Chip with Super Low ESR & High Heat Resistance .....	152
<b>KEMET .....</b>	<b>152</b>
KEMET ELECTRONICS CORPORATION.....	152
<i>Company Background:</i> .....	153
<i>Annual Revenues For KEMET Electronics Corporation and Forecast for FY 2019</i> .....	153
<i>KEMET (RIFA AB): Aluminum Capacitor Revenues</i> .....	154
<i>Development of the AO Capacitor</i> .....	155
A700 Series AO-CAP .....	155
<i>SMT Polymer Aluminum AO Capacitor General Specifications, Pricing and CGS</i> .....	155
<i>KEMET-Evox-Rifa Group OYJ</i> .....	156
<b>KUAN KUN (SU'SCON) .....</b>	<b>156</b>
KUAN KUN ELECTRONIC ENTERPRISE COMPANY LIMITED (SU'SCON) .....	156
<i>Kuan Kun: About This Company:</i> .....	157
<i>Kuan Kun : Factory Output:</i> .....	157
<i>Kuan Kun: Customers:</i> .....	157
<i>Kuan Kun: Anhydrous Series Capacitor Developments:</i> .....	157
<i>Kuan Kun: Polymer Aluminum Capacitor Developments:</i> .....	157
<i>Kuan Kun: Additional Capacitor Developments:</i> .....	157
<b>LELON .....</b>	<b>158</b>
LELON ELECTRONICS CORP. ....	158
<i>About Lelon:</i> .....	158
<i>Lelon History:</i> .....	159



<i>Lelon: Conductive Polymer Aluminum Capacitor Product Line:</i> .....	159
<i>Lelon: Radial Leaded Conductive Polymer Capacitor Line:</i> .....	159
OCR Radial Capacitor Line:.....	159
OCV Chip Capacitor Line:.....	159
<i>Lelon Company Revenues and Trends:</i> .....	159
<b>MAN YUE</b> .....	<b>161</b>
MAN YUE ELECTRONICS COMPANY LIMITED.....	161
<i>Man Yue: About This Company and the Samxon and XCon Brands:</i> .....	161
<i>ManYue: Revenue and Market Share Analysis:</i> .....	161
<i>Man Yue: Development of The Conductive Polymer Line: X-CON:</i> .....	162
<i>Man Yue: Polymer Aluminum Capacitor Products:</i> .....	163
Radial Leaded Conductive Polymer Aluminum X-Con:.....	163
Vertical Chip Conductive Polymer Aluminum X-Con:.....	163
<i>Man Yue: Developments in the Conductive Polymer Capacitor Markets Outside of Japan:</i> .....	163
<b>MATSUKI</b> .....	<b>164</b>
MATSUKI POLYMER TECHNOLOGY CO., LTD.....	164
<i>Matsuki: About This Company:</i> .....	164
<i>Matsuki: Relationship With Enesol:</i> .....	164
MPCAP Polymer Aluminum Capacitor:.....	164
<i>Matsuki: Mass Production of Aluminum Capacitors:</i> .....	165
<b>MURATA</b> .....	<b>165</b>
MURATA MANUFACTURING COMPANY LIMITED.....	165
<i>Company Description:</i> .....	165
<i>Murata Buys SDK Capacitor</i> .....	166
Murata Functional Polymer Aluminum Capacitor -Molded Chip ECAS Series.....	166
<i>Murata Statement About Augmenting MLCC With Polymer Aluminum Chips:</i> .....	166
<i>Murata Strategy For Polymer Aluminum Capacitors:</i> .....	167
<b>NANTONG JIANGHAI</b> .....	<b>167</b>
NANTONG JIANGHAI CAPACITOR CO. LTD.....	167
<i>Nantong Jianghai: About This Company:</i> .....	167
<i>Nantong Jianghai: Capacitor Product Line:</i> .....	168



*Nantong Jianghai: Revenue and Market Share Analysis:*..... 168

*Nantong Jianghai: Trends In Private Labeling:*..... 170

*Nantong Jianghai: JV With KEMET:* ..... 170

**NICHICON**.....**170**

NICHICON CORPORATION (RIC: 6996)..... 170

*About Nichicon:* ..... 171

*Changing Product Line at Nichicon:*..... 173

*FMD Acquisition:*..... 173

NICHICON SWOT ANALYSIS ..... 173

*Nichicon Strengths:* ..... 173

*Nichicon Weaknesses:* ..... 174

*Nichicon Opportunities:*..... 174

*Nichicon Threats:* ..... 174

NICHICON: TECHNOLOGY TRENDS IN ALUMINUM CAPACITORS: ..... 175

Conductive Polymer Aluminum Solid Electrolytic Capacitors..... 175

*Nichicon: -2020 Riding The Megatrends*..... 176

*Nichicon Recent Product Developments:*..... 177

105 C, 20,000 Hours ..... 177

Chip Type Size Additions..... 177

EDLC Low ESR EDLC ..... 177

135 C Chip Type PCH Low ESR Solid Polymer Capacitors ..... 177

800V Electrolyte Developments..... 178

Audio Capacitor Developments..... 178

Anti-Vibration Capacitors ..... 178

**NIPPON CHEMI-CON**.....**179**

NIPPON CHEMI-CON CORPORATION (RIC:6996)..... 179

*About Nippon Chemi-Con:* ..... 179

*Nippon Chemi-Con: Revenue and Market Share Analysis:*..... 179

*NCC: Sales By World Region:* ..... 181

*NCC Product Line: Breakdown*..... 182

NIPPON CHEMI-CON SWOT ANALYSIS ..... 182

*Nippon Chemi-Con Strengths:* ..... 182



Paumanok Publications  
Industrial Strength Market Research

<i>Nippon Chemi-Con Weaknesses:</i> .....	182
<i>Nippon Chemi-Con Opportunities:</i> .....	182
<i>Nippon Chemi-Con Threats:</i> .....	183
<b>NIPPON CHEMI-CON: TECHNOLOGY TRENDS &amp; DIRECTIONS: FY 2019</b> .....	183
NCC- 2019 Capacitor Developments .....	183
Conductive Polymer V-Chip 135 C .....	183
Air Bag Capacitors .....	183
Radial 135 C for Auto .....	184
<b>NIPPON INDUSTRIES</b> .....	<b>184</b>
NIPPON INDUSTRIES, INC. ....	184
<i>Company Description:</i> .....	184
<i>Corporate History:</i> .....	184
<i>Aluminum Capacitor Product Line:</i> .....	185
<i>Conductive Polymer Capacitor Line at Nippon Industries</i> .....	185
The New Hybrid Liquid V-Chip Aluminum Capacitor Line: .....	185
The Horizontal Molded Chip Aluminum Capacitor:.....	185
<b>PANASONIC</b> .....	<b>186</b>
PANASONIC CORPORATION (RIC: 6752): .....	186
<i>Panasonic Corporation: Description:</i> .....	186
<i>Absorption of Panasonic Electronic Devices Into Panasonic Corporation</i> .....	187
<i>Merger With Sanyo:</i> .....	187
<i>Panasonic Automotive &amp; Industrial Systems Company Revenues: FY 2014 and FY 2015</i> .....	187
<i>Panasonic Automotive &amp; Industrial Systems Group Revenue Breakdown by Product Category: FY 2014</i> .....	188
<i>Panasonic ICT Components Group:</i> .....	190
<i>Panasonic Passive Component Revenues:</i> .....	190
<i>Panasonic Revenues by World Region:</i> .....	190
<i>Panasonic Revenues by End-Use Market Segment:</i> .....	190
<i>Panasonic: Aluminum Electrolytic Capacitor Revenue and Market Share Analysis:</i> .....	190
PANASONIC SWOT ANALYSIS .....	191
<i>Panasonic Strengths:</i> .....	191
<i>Panasonic Weaknesses:</i> .....	191
<i>Panasonic Opportunities:</i> .....	191





<i>Panasonic Threats:</i> .....	192
PANASONIC: TECHNOLOGY TRENDS & DIRECTIONS: FY 2019 .....	192
Panasonic: Technology Trends in Capacitors: FY 2019 .....	192
New EEH-ZS Series Pushes The Boundaries Of The Hybrid Polymer Electrolytic Segment With Higher Capacitance And Ripple Current Ratings .....	192
Panasonic Introduces the New EEH-ZS Series Surface Mount, Conductive Polymer Hybrid Aluminum Electrolytic Capacitors! .....	192
Panasonic Introduces the New EEU-FP Series Through-Hole Mount Aluminum Electrolytic Capacitors.....	193
Panasonic Introduces the New EEH-ZF Series Through-Hole Mount Conductive Polymer Aluminum Electrolytic Capacitors .....	193
<b>RUBYCON.....</b>	<b>193</b>
RUBYCON CORPORATION (PRIVATE).....	193
<i>Company Description</i> .....	193
<i>Rubycon Product Lines:</i> .....	194
<i>Rubycon Revenue Estimates For Passive Components</i> .....	194
<i>Rubycon: Revenue and Market Share Analysis:</i> .....	194
<i>Rubycon Annual Revenues and Estimates: 2014 Versus 2019</i> .....	194
<i>Rubycon Revenues By Product Line and Type:</i> .....	194
<i>Rubycon Revenues By End-Use Market Segment</i> .....	195
<i>Rubycon Manufacturing Footprint in Asia:</i> .....	195
<i>Rubycon Passive Component Technology Assessment:</i> .....	195
RUBYCON SWOT ANALYSIS .....	195
<i>Rubycon Strengths:</i> .....	195
<i>Rubycon Weaknesses:</i> .....	196
<i>Rubycon Opportunities:</i> .....	196
<i>Rubycon Threats:</i> .....	196
RUBYCON: TECHNOLOGY TRENDS & DIRECTIONS: FY 2019 .....	196
<b>SAMWHA .....</b>	<b>197</b>
SAMWHA CAPACITOR GROUP (SAMWHA ELECTRIC) .....	197
<i>Samwha Electric Company Limited (Aluminum Capacitors)</i> .....	197
<i>SamWha Capacitor Company (Parent): About This Company:</i> .....	198
<i>SamWha Electric Company: About This Company:</i> .....	198
<i>SamWha Capacitor Group Revenues and Forecasts:</i> .....	198
<i>SamWha Electric: Aluminum Electrolytic Capacitor Products:</i> .....	199



<i>Samwha Electric: Vertical Chip Type Conductive Polymer Aluminum Capacitors:</i> .....	200
<i>Samwha Electric: Radial Leaded Type Conductive Polymer Aluminum Capacitors:</i> .....	200
<i>Samwha Electric: Molded H Chip Type Conductive Polymer Aluminum Capacitors:</i> .....	200
<i>SamWha New Product Development</i> .....	200
<b>SAMYOUNG ELECTRONICS</b> .....	<b>200</b>
SAMYOUNG ELECTRONICS CO LTD.....	200
<i>About Samyoung Electronics:</i> .....	201
<i>SamYoung Aluminum Electrolytic Capacitors: Revenue and Market Share Analysis:</i> .....	201
<i>Conductive Polymer Aluminum Capacitors at Samyoung:</i> .....	203
Surface Mount Type: Conductive Polymer Aluminum Capacitors: .....	203
Radial Leaded: Conductive Polymer Aluminum Capacitors: .....	203
<b>SUN ELECTRONIC</b> .....	<b>203</b>
SUN ELECTRONIC INDUSTRIES CORP. ....	203
<i>Sun EIC: Company Description:</i> .....	203
<i>Sun Electronic Industries: Aluminum Capacitor Revenue Analysis:</i> .....	204
<i>Sun EIC: Company History:</i> .....	204
EP Capacitor and Hybrid Polymer Electrolyte:.....	204
<i>Sun EIC: EP Cap-Conductive Polymer Aluminum Product Line (Hybrid Conductive Polymer):</i> .....	205
HVA Surface Mount Vertical Chip Design: .....	205
HEA Radial Leaded Design: .....	205
<i>Sun EIC: Key Developments in Polymer Technology:</i> .....	205
Polymer aluminum electrolytic capacitor with industry's first 130°C high-reliability guarantee developed.....	205
Industry's first 80V and 100V polymer aluminum electrolytic capacitor developed.....	205
SUN EIC- Low Z-Long Life SMD Type New Product Development in FY 2018/2019 .....	206
<b>TDK</b> .....	<b>206</b>
TDK CORPORATION (RIC: 6762):.....	206
<i>About TDK Corporation:</i> .....	206
<i>Annual Revenues for TDK's Capacitor Group: FY 2019</i> .....	206
<i>TDK- EPCOS: Aluminum Capacitor Revenue and Market Share Analysis:</i> .....	208
TDK SWOT ANALYSIS: .....	208
<i>TDK-EPC Strengths:</i> .....	208
<i>TDK-EPC Weaknesses:</i> .....	208



Paumanok Publications  
Industrial Strength Market Research

*TDK-EPC Opportunities:* ..... 209  
*TDK-EPC Threats:* ..... 209  
 TDK CORPORATION: TECHNOLOGY TRENDS & DIRECTIONS: FY 2015 ..... 209  
*EPCOS, Becromal and Heidenheim:* ..... 210  
 EPCOS: Aluminum Electrolytic Capacitor Products: ..... 210  
 EPCOS: Applications For Aluminum Capacitors By Type: ..... 211

**TEAPO (G-LUXON) ..... 211**  
 TEAPO ELECTRONIC CORP. .... 211  
*About Teapo Electronics Corp.* ..... 212  
*Teapo Electronic Corp.: Revenue Analysis in Aluminum Electrolytic Capacitors* ..... 212  
*Teapo Electronic Corp.: V-Chip Conductive Polymer Aluminum Electrolytic Capacitors at Teapo:* ..... 214  
*Teapo Electronic Corp. Radial Leaded Conductive Polymer Aluminum Electrolytic Capacitors at Teapo:* ..... 214

**VISHAY INTERTECHNOLOGY ..... 214**  
 VISHAY INTERTECHNOLOGY (NYSE:VSH) ..... 214  
*About Vishay:* ..... 214  
*Annual Revenues For Vishay Intertechnology (Capacitor Group Only): 2019* ..... 215  
*Vishay Intertechnology- BCC Operations: Revenue and Market Share Analysis* ..... 217  
 VISHAY SWOT ANALYSIS: ..... 217  
*Vishay Strengths:* ..... 217  
*Vishay Weaknesses:* ..... 217  
*Vishay Opportunities:* ..... 217  
*Vishay Threats:* ..... 217

## Table of Figures

FIGURE 1: TECHNOLOGY TRENDS BY MANUFACTURER IN ALUMINUM CAPACITORS FY 2019 ..... 27  
 FIGURE 2: IMPACT OF MLCC PARTS SHORTAGE ON OTHER DIELECTRICS; INCLUDING AL203 ..... 34  
 FIGURE 3: OVERLAP BETWEEN MLCC AND ALUMINUM ELECTROLYTIC CAPACITORS ..... 36  
 FIGURE 4: FIXED CAPACITOR MARKET BREAKDOWN BY SUB-CATEGORY: FY 2019 ..... 41  
 FIGURE 5: THE SUPPLY CHAIN FOR ALUMINUM ELECTROLYTIC CAPACITORS ..... 45  
 FIGURE 6: THE YEN, WON, AND NT\$ TO THE US DOLLAR OVER TIME ..... 48



FIGURE 7: ALUMINUM ELECTROLYTIC CAPACITORS BY COMPONENT CONFIGURATION: FY 2019..... 56

FIGURE 8: CHANGES IN DEMAND BY CONFIGURATION OVER TIME: FIVE YEAR SHIFTS IN CONSUMPTION VALUE BY COMPONENT TYPE ESTIMATES (ENDING MARCH 2019)..... 58

FIGURE 9: REVENUE ANALYSIS FOR THE WORLDS TOP 14 PRODUCERS OF ALUMINUM CAPACITORS AND INDIVIDUAL FORECASTS TO FY 2019 .. 60

FIGURE 10: GLOBAL ALUMINUM ELECTROLYTIC CAPACITOR HISTORICAL CONSUMPTION VALUE: FY 2003-FY 2018; 2019 FORECAST (IN MILLIONS OF US DOLLARS)..... 62

FIGURE 11: GLOBAL ALUMINUM ELECTROLYTIC CAPACITOR CONSUMPTION VOLUME: FY 2003-2013 (IN BILLIONS OF PIECES)..... 64

FIGURE 12: HISTORICAL PRICING- ALUMINUM ELECTROLYTIC CAPACITOR PRICING: FY 2003-2018; 2019 FORECAST(IN US DOLLARS PER THOUSAND UNITS)..... 66

FIGURE 13: ALUMINUM ELECTROLYTIC CAPACITORS: GLOBAL CONSUMPTION VALUE BY END-USE MARKET SEGMENT: FY 2019..... 68

FIGURE 14: CHANGE IN REVENUES BY END-USE MARKET SEGMENT: FY 2010, FY 2015 COMPARED TO FY 2019 ..... 72

FIGURE 15: GLOBAL CONSUMPTION VALUE FOR ALUMINUM ELECTROLYTIC CAPACITORS BY WORLD REGION: FY 2019 ..... 74

FIGURE 16: ALUMINUM ELECTROLYTIC CAPACITOR CONSUMPTION BY KEY COUNTRY: FY 2019 ..... 77

FIGURE 17: FY 2019 FORECASTED VALUE OF CONSUMPTION FOR ALUMINUM ELECTROLYTIC CAPACITORS BY KEY COUNTRY ..... 79

FIGURE 18: ALUMINUM ELECTROLYTIC CAPACITOR SALES TRENDS BY WORLD REGION: FY 2014-FY 2019..... 82

FIGURE 19: PLASTIC FILM CAPACITOR LEAD TIMES BY TYPE (IN WEEKS): JANUARY 2013- JANUARY 2019 ..... 84

FIGURE 20: ALUMINUM ELECTROLYTIC CAPACITOR VENDORS: FY 2019 MARKET SHARES..... 88

FIGURE 21: ALUMINUM ELECTROLYTIC CAPACITOR MANUFACTURERS: FACTORIES BY COUNTRY ..... 92

FIGURE 22: FORECAST: GLOBAL CONSUMPTION VOLUME FORECASTS FOR ALUMINUM CAPACITORS: FY 2019-FY 2023 (IN BILLIONS OF PIECES) ..... 95

FIGURE 23: FORECAST: GLOBAL CONSUMPTION \$VALUE FORECASTS FOR ALUMINUM CAPACITORS: FY 2019-FY 2023 (IN MILLIONS OF US DOLLARS)..... 97

FIGURE 24: FORECAST: GLOBAL PRICING FORECASTS FOR ALUMINUM CAPACITORS: FY 2019-2023 (IN US DOLLARS PER THOUSAND PIECES) ..... 99

FIGURE 25: FORECAST: GLOBAL CONSUMPTION VALUE FORECASTS FOR ALUMINUM CAPACITORS BY END-USE MARKET SEGMENT: FY2019-2023 (IN MILLIONS OF US DOLLARS)..... 101

FIGURE 26: AIHUA GROUP REVENUES CONVERTED INTO US DOLLARS: 2014-2018 ANNUALIZED..... 116

FIGURE 27: APAQ REVENUES CONVERTED INTO US DOLLARS: 2014-2018 ANNUALIZED..... 120

FIGURE 28: CAPXON REVENUES CONVERTED INTO US DOLLARS: 2014-2018 ANNUALIZED..... 123

FIGURE 29: TAIWAN CHINSAN REVENUES CONVERTED INTO US DOLLARS: 2014-2018 ANNUALIZED..... 128

FIGURE 30: ELNA REVENUES CONVERTED INTO US DOLLARS: 2014-2018 ANNUALIZED..... 135

FIGURE 31: KEMET REVENUES: 2015-2019 ANNUALIZED ..... 154



FIGURE 32: LELON REVENUES CONVERTED INTO US DOLLARS: 2012-2019 ANNUALIZED ..... 160

FIGURE 33: MAN YUE REVENUES CONVERTED INTO US DOLLARS: 2012-2019 ANNUALIZED ..... 162

FIGURE 34: NANTONG JIANGHAI REVENUES CONVERTED INTO US DOLLARS: 2012-2019 ANNUALIZED ..... 169

FIGURE 35: NICHICON REVENUES CONVERTED INTO US DOLLARS: 2012-2019 ANNUALIZED ..... 172

FIGURE 36: NIPPON CHEMI-CON REVENUES CONVERTED INTO US DOLLARS: 2012—2019 ANNUALIZED ..... 180

FIGURE 37: PANASONIC AUTOMOTIVE & INDUSTRIAL GROUP REVENUE BREAKDOWN BY SUB-MARKET:..... 189

FIGURE 38: SAMWHA CAPACITOR REVENUES CONVERTED INTO US DOLLARS: 2012-2019 ANNUALIZED ..... 198

FIGURE 39: SAMYOUNG REVENUES CONVERTED INTO US DOLLARS: 2012-2019 ANNUALIZED ..... 202

FIGURE 40: TDK CAPACITOR GROUP REVENUES CONVERTED INTO US DOLLARS: 2015-2019 ANNUALIZED ..... 207

FIGURE 41: TEAPO REVENUES CONVERTED INTO US DOLLARS: 2012-2019 ANNUALIZED ..... 213

FIGURE 42: VISHAY INTERTECHNOLOGY REVENUES 2015-2019 ANNUALIZED..... 216



# 1.0 Executive Summary:

## 1.1 Key Findings of This Report:

### 1.2 Aluminum Electrolytic Capacitors: Value and Volume of Global Consumption: FY 2019- FY 2020 Forecast:

- This study addresses the global market for aluminum electrolytic capacitors. Aluminum electrolytic capacitors are consumed in many of the key end products that drive the global high-technology economy and are used for bypass, decoupling, filtering and burst power on printed circuit boards and in industrial equipment. Major end-product markets include TV sets and home theatre equipment; desktop and notebook computers, automobiles, telecommunications infrastructure equipment, defense electronics, medical devices and oil & gas services equipment. Aluminum electrolytic capacitors are an \$4,837 billion USD sub-set of the \$29.5 billion (Record Year) global capacitor industry (Fiscal Year ending March 2019 estimates). The shipment volume of aluminum electrolytic capacitors for FY 2019 is estimated to be about 130 billion pieces (a banner year), and average unit pricing from the manufacturer averages about \$0.03 to \$0.04 dollars a unit.

### 1.3 Impact of US China Trade War On Global Sales of Aluminum Electrolytic Capacitors: FY 2018-FY 2019 Forecast:

- In FY 2019 (Year ending March 2019) a trade war developed between the United States and China over tariffs. An important part of the trade war involved Chinese made capacitors. China has tremendous production (transplant and domestic) capabilities for both aluminum and plastic film type capacitors because of their historical consumption in consumer audio and video imaging equipment, which also has tremendous production in China. The trade war has been described by key domestic Chinese capacitor manufacturers as “frustrating.”



Paumanok Publications  
Industrial Strength Market Research