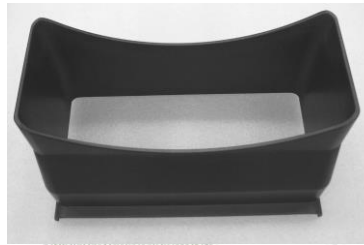
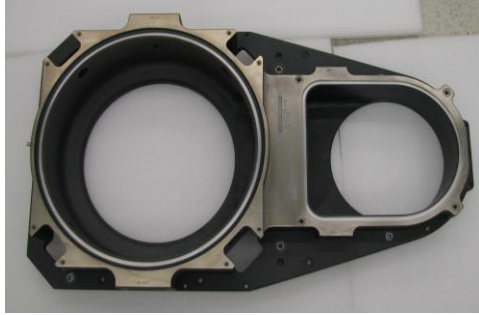




ALDON TECHNOLOGIES SERVICES PTE LTD



Anodization Technology



Aldon Proprietary Information

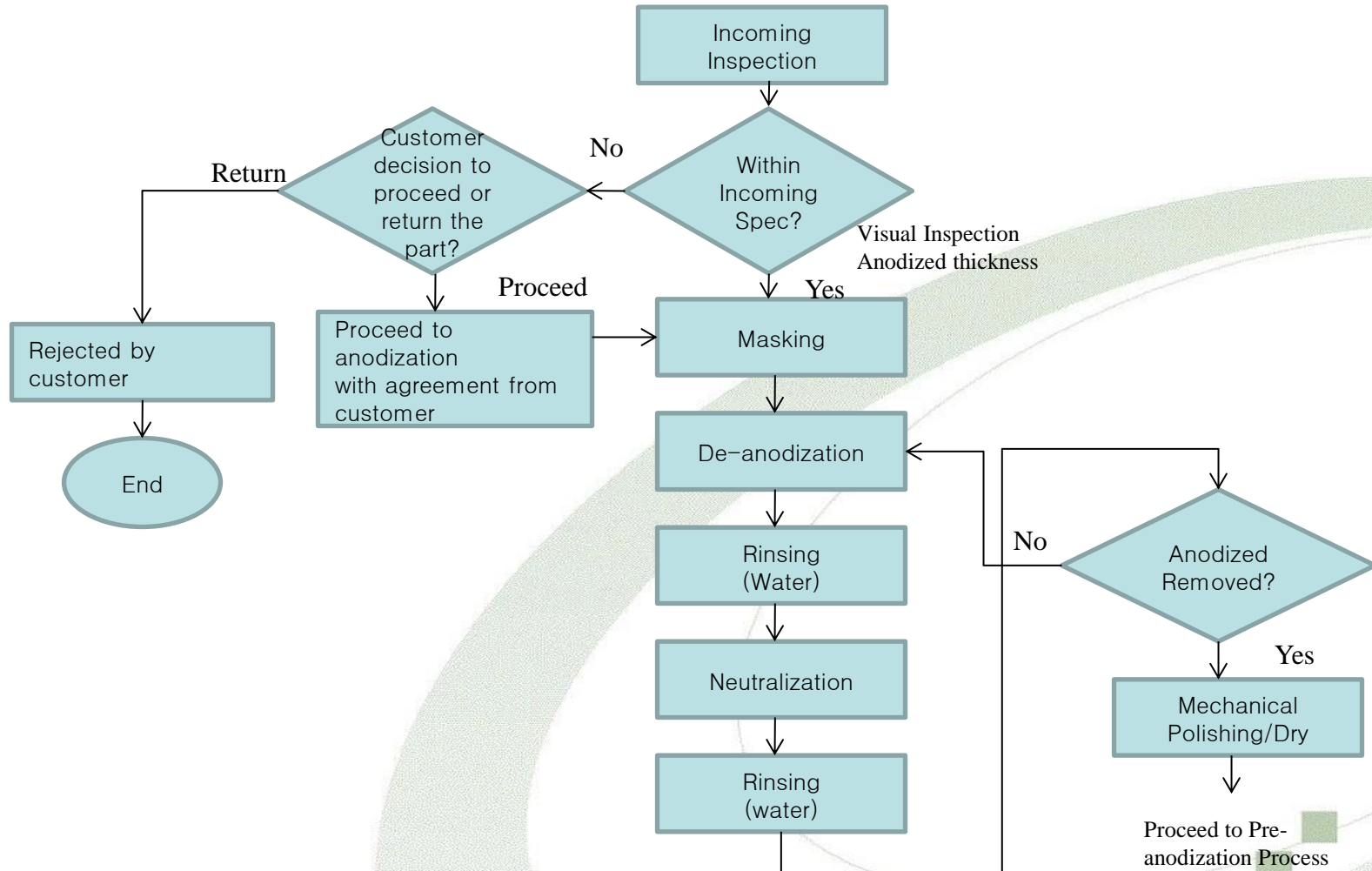
- Tank Capacity : 2.0m(L)x1.0m(W)x1.8m(H)
- Fully automated anodizing line for consistent and reliable process
- Capable of performing sealed Sulphuric anodize and Oxalic anodize





De-anodization Process Flow

ALDON TECHNOLOGIES SERVICES PTE LTD

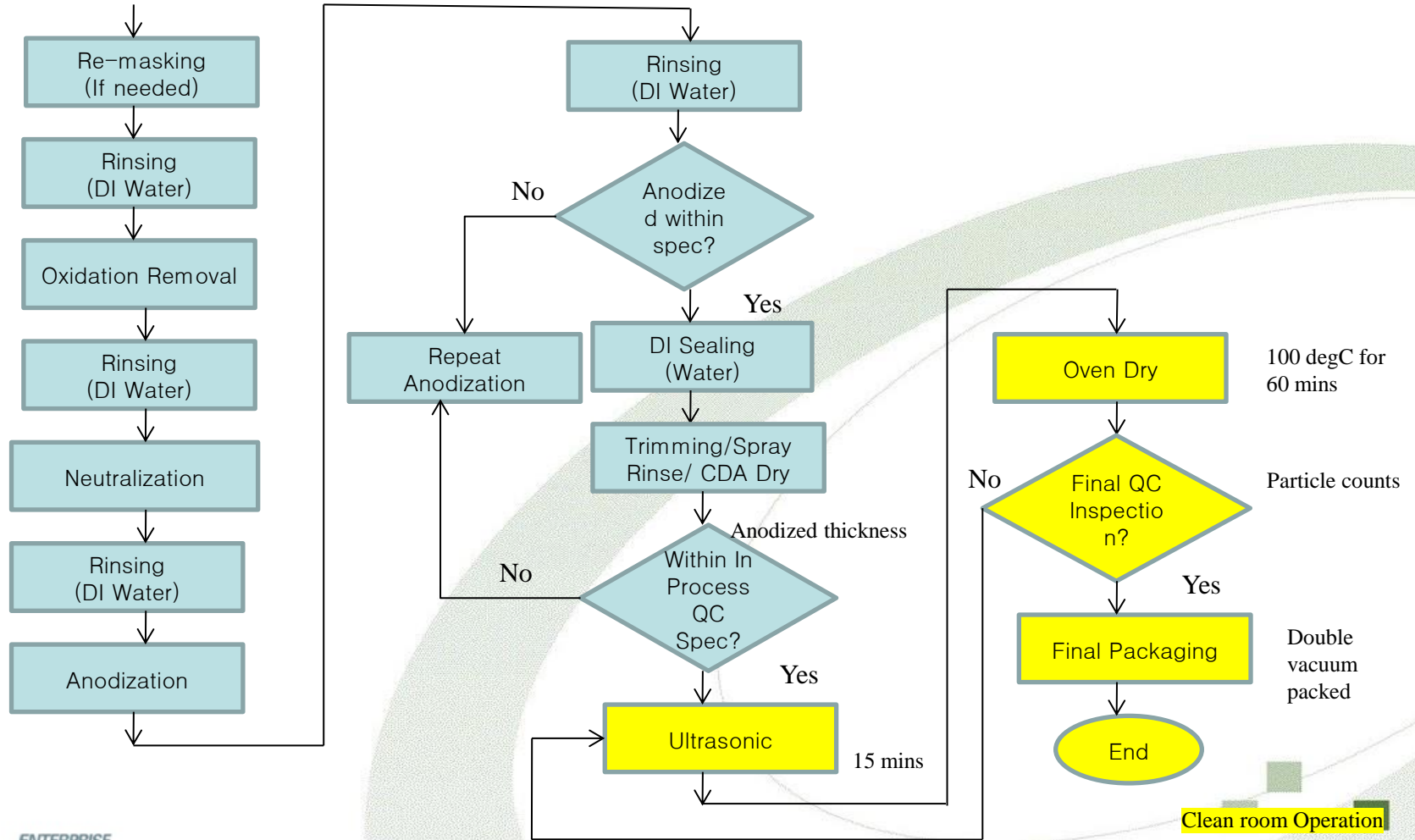


Aldon Proprietary Information



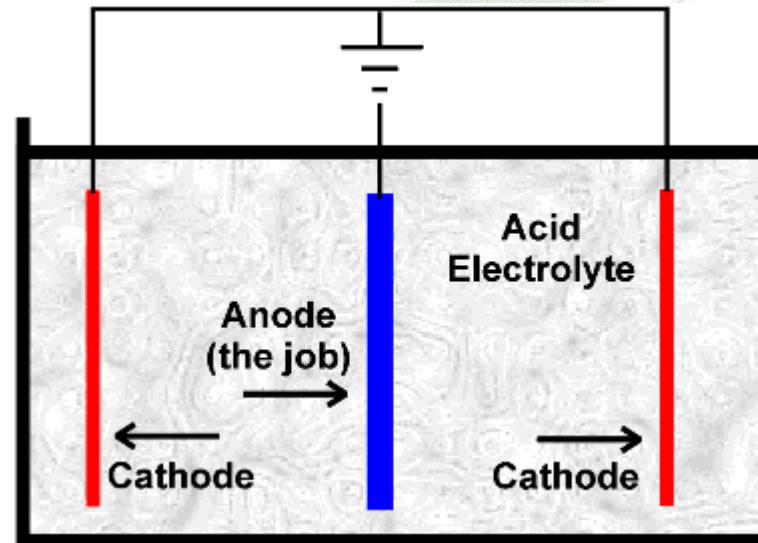
Anodization Process Flow

ALDON TECHNOLOGIES SERVICES PTE LTD



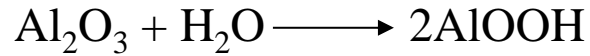
Aldon Proprietary Information

- Anodizing is achieved by immersing the aluminum workpiece into an electrolytic bath and with passing through an electric current.
- A cathode is mounted to the inside of the anodizing tank.
- The aluminium workpiece acts as an anode.
- The current releases hydrogen at the cathode (the negative electrode) and oxygen at the surface of the aluminium anode, creating a build-up of aluminium oxide

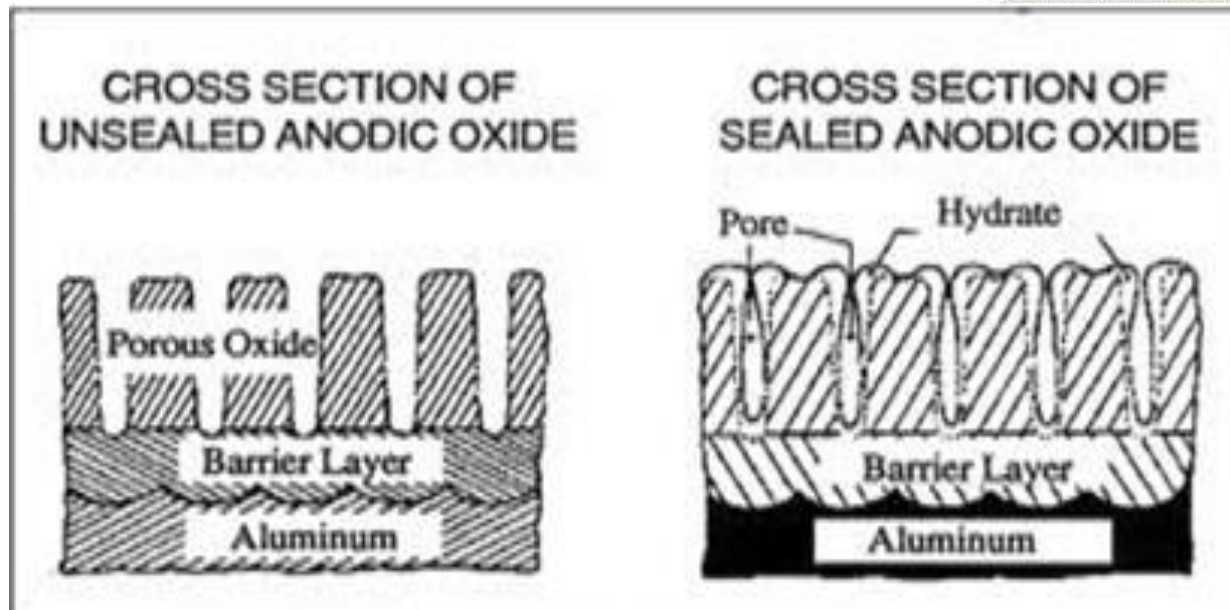


- Oxygen from the electrolysis of water reacts with surface aluminum.
- $2\text{H}_2\text{O}_2 + \text{Electrons} \rightarrow \text{O}_2 + 2\text{H}_2$
- $4\text{Al (Aluminium)} + 3\text{O}_2 \text{ (Oxygen)} \rightarrow 2\text{Al}_2\text{O}_3 \text{ Aluminium Oxide}$
- As Al atoms are extracted from the surface of Al workpiece, pore-like pits are formed.
- The surfaces of these pits are very reactive due to the availability of electrons for bonding.
- The in-processing forming Al_2O_3 with electrons, bonds with metal surface to form a stable structure.

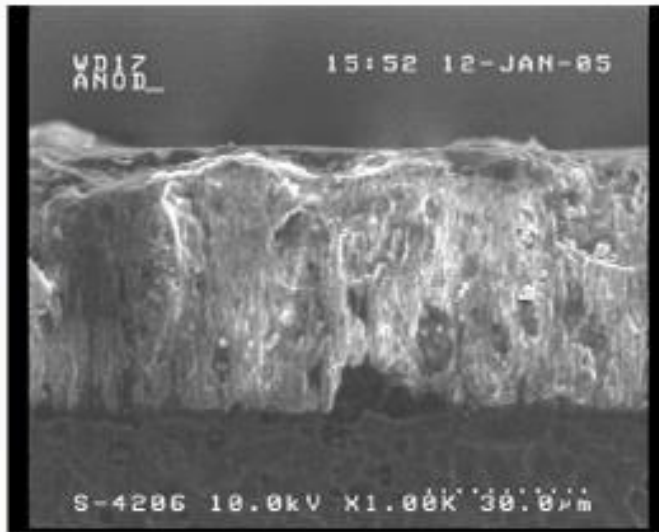
- In hot DI sealing, the part is immersed into hot DI water (Spec: 95-105 °C)
- The anodized coating (Aluminum oxide, Al_2O_3) are made up of small pores.
- Hot DI sealing converts the aluminum oxide in the pores to hydrated aluminum oxide (Boehmite) which is a larger molecule and fills up the pore with hydrated aluminum oxide.
- Hot DI water seal is often used for which low particle contamination is important.



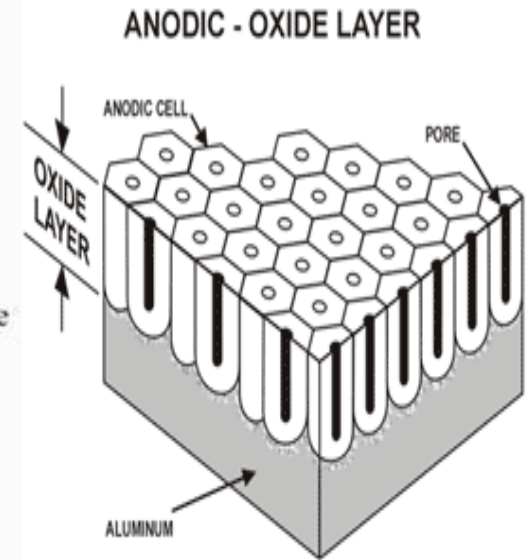
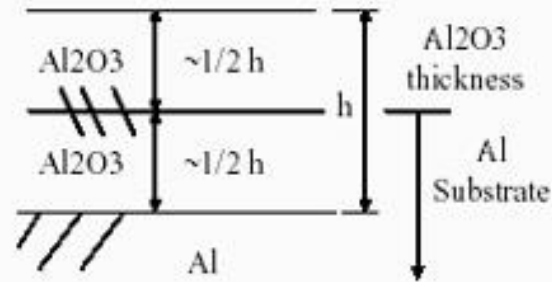
- Below depicts DI water sealing of anodic oxide coating.



Microstructure of Anodization Layer



SEM





ALDON TECHNOLOGIES SERVICES PTE LTD

Anodization Properties

- Insulation Resistance
- Particle Control
- Wear Resistance
- Temperature Resistance
- Corrosion Resistance
- Aesthetic Effect



Aldon Proprietary Information



Anodization General Specifications

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TYPICAL ANODIZATION SPEC. FOR SEMI-CONDUCTOR APPLICATION						
Type	Process Temp	Electrolyte	Film Thickness mm	Breakdown Voltage	Colour	Application in Process Kits
2	15~20°C	Sulphuric Acid	0.005~0.01	>300VDC	Light Grey	-CVD Shower Head -Cooling Plate -Hi Temp Isolation Sheet Shield
3.1 Hardcoat	-5~0°C	Sulphuric Acid	0.05~0.01	>1,000VDC	Almost Black	-Electrode -Clamp Ring -Chamber Liner -Upper Chamber -General Application
3.2 Hardcoat	15~20°C	Oxalic Acid	0.02~0.03	>1,000VDC	Yellowish Grey	-GDP -Susceptor -Chamber Liner



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ALDON TECHNOLOGIES SERVICES PTE LTD

Anodization Technology Applications

- Semi-conductor & Flat Panel (LCD) improvement
- Aviation Parts
- Clean-Energy (Solar)
- Oil/Gas and Petro-chemical repair
- Repair and Overhaul
- Coating to Customer's Requirements



Aldon Proprietary Information



ALDON TECHNOLOGIES SERVICES PTE LTD

ATS Recommendations

- Majority of the parts fall in anodization thickness range of 50-60um
- Able to withstand breakdown voltage of 1000 VDC.
- Recommended limit to refurbishment: 3 times (subject to customer)
- Recommended minimum part thickness for processing: 1mm



Aldon Proprietary Information



ATS Quality Management

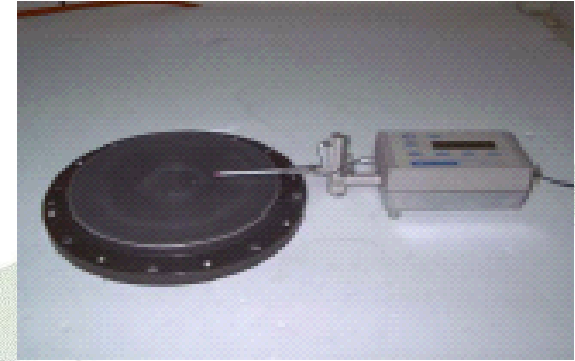
ALDON TECHNOLOGIES SERVICES PTE LTD



Coating Thickness Meter



Breakdown Voltage



Roughness Check



Clean-room Assembly



Vacuum Packing



Aldon Proprietary Information



Incoming QC Inspection Report

ALDON TECHNOLOGIES SERVICES PTE LTD

ATS A Company of Aldon Group		Incoming Inspection Report Anodize & Y2O3 Coating				Ref No:	JOA1802282-02A																																				
Part No.		0041-12168	Serial No.	300911N-1310-0030	Customer	Module		AMAT Parts																																			
Name		Wall Liner		EGP No.	2018028278	Date In (yyyymmdd)	20181001	Date Out (yyyymmdd)																																			
Check Point Spec	Anodizing Thk (µm)	<table border="1"> <tr><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> <tr><td>5</td></tr> <tr><td>6</td></tr> <tr><td>7</td></tr> <tr><td>8</td></tr> <tr><td>9</td></tr> <tr><td>10</td></tr> <tr><td>11</td></tr> <tr><td>12</td></tr> <tr><td>13</td></tr> <tr><td>14</td></tr> <tr><td>15</td></tr> <tr><td>Min.</td></tr> <tr><td>Max.</td></tr> <tr><td>Avg.</td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Min.	Max.	Avg.	<p>Pictures & illustrations:</p>    <p>Anodized coating damage</p> <table border="1"> <thead> <tr> <th colspan="2">Visual Inspection</th> </tr> </thead> <tbody> <tr><td></td><td>Scratches</td></tr> <tr><td></td><td>Dents</td></tr> <tr><td></td><td>Cracks</td></tr> <tr><td></td><td>Chips / Peel off</td></tr> <tr><td>X</td><td>Stains</td></tr> <tr><td>X</td><td>Anodized coating damage</td></tr> <tr><td></td><td>No Abnormalities Found</td></tr> </tbody> </table>							Visual Inspection			Scratches		Dents		Cracks		Chips / Peel off	X	Stains	X	Anodized coating damage		No Abnormalities Found
	1																																										
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Ref only	Y2O3 Thk (µm)	Ref only																																									
Notes:																																											
Insp. Result	ACCEPT																																										
Inspected by	Li Ting																																										
Reviewed by	ADAM																																										



Aldon Proprietary Information

ALDON TECHNOLOGIES SERVICES PTE LTD

 A Company of Aldon Group		Final Inspection Report Anodize & Y2O3 Coating			Ref No:	JOA1802282-02A		
Part No.	0041-12166		Serial No.	300911N-1310-0030	Customer			
Name	Wall Liner		EGP No.	2018028278	Date In (yyyymmdd)	20181001	Date Out (yyyymmdd)	20181008
Check Point Anodizing Thk. (µm) Y2O3 Thk (µm)	Spec	Ref only	200 / ± 30	Pictures & illustrations:  				
	1							
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	4							
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	10							
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	12							
	13							
	14							
	15							
Min.								
Max.								
Avg.								
Surface Roughness (Ra 3.5 - 5.5 µm)		Notes:						
Surface Particle <5 cnt/cm² @ >0.3µm								
Insp. Result	ACCEPT							
Inspected by	Li Ting							
Reviewed by	ADAM							
Y0041-12166-s300911N-1310-0030-d20181001-JOA1802282-02A								

Visual Inspection	
	Scratches
	Dents
	Cracks
	Chips
	Stains
	Anodized coating damage
X	No Abnormalities Found



Final QC Inspection Report

ALDON TECHNOLOGIES SERVICES PTE LTD

 A Company of Aldon Group		Final Inspection Report Anodized Coating				Ref No:	JOA1900003-01		
									
Part No.	0040-02609	Serial No.	119423-038	Customer			Module	Super E	
Name	CATHODE LINER		GP No.	PMT-18-12-5600	Date In (yyyymmdd)	20190102	Date Out (yyyymmdd)	20190103	
Check Point	Anodizing Thk. (mil)	Pictures & illustrations:							
		Spec	 						
		1							
		2							
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12									
Min.									
Max.									
Avg.									
Surface Roughness (Ra >50 μ-inch)		<input type="checkbox"/>							
Surface Particle <5 cnt/cm ² @>0.3μm		<input type="checkbox"/>							
Notes:									
Insp. Result	ACCEPT								
Inspected by	Li Ting								
Reviewed by	ADAM								
									
A0040-02609-s119423-038-d20190102-JOA1900003-01									



Aldon Proprietary Information



Typical Parts Lists (Brand New or Refurbishment)

ALDON TECHNOLOGIES SERVICES PTE LTD

- TEL Tools Chamber Parts
- LAM Tools Chamber Parts
- AMAT Tools Chamber Parts
- AMEC Tools Chamber Parts
- LCD TEL Etcher Chamber Wall Parts
- Ability to tailor made and anodize according to customer's requirements



Aldon Proprietary Information



ATS Quality Management

ALDON TECHNOLOGIES SERVICES PTE LTD



Coating Thickness Meter



Breakdown Voltage



Roughness Check



Clean-room Assembly



Vacuum Packing



Aldon Proprietary Information



ALDON TECHNOLOGIES SERVICES PTE LTD

ISO 9001 Certificate



PSB Singapore

CERTIFICATE

The Certification Body
of TÜV SÜD PSB Pte Ltd
certifies that

ALDON TECHNOLOGIES SERVICES PTE LTD
20 Loyang Lane
Singapore 508919

has established and applies
a Quality Management System for


**Provision of Chemical and Surface Treatment Services
for Process Equipment used in Electronics Industry**
(See Appendix to Certificate for Details)

Proof has been furnished that the requirements
according to

ISO 9001 : 2015

are fulfilled. The certificate is valid from 2022-11-04 to 2025-11-07
Certificate Registration No. 2007-2-1614
Date of Print : 2022-11-04




SIEW Kwai Heng, Tiffany
Head of Certification Body
Management Systems
Business Assurance Division



Page 1 of 2

Please refer to www.tuvsud.com/psb-sg for current certificate status in the "Directory of Management System Certified Companies".

TÜV SÜD PSB Pte Ltd • 15 International Business Park Singapore 609937

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Aldon Proprietary Information



Some Parts List – Anodization Parts (Sulphuric Anodization)

ALDON TECHNOLOGIES SERVICES PTE LTD

AMAT DPS

Item	Picture	Module	OEM P/N	Description	Tools	Material
1		ETCH	0040-02544	DPS UPPER CHAMBER	DPS	Metal, Aluminum
2		ETCH	0021-01421	Chamber,upper, DPS	DPS-Metal	Metal, Aluminum
3		ETCH	0040-52662	DPS UPPER CHAMBER	DPS	Metal, Aluminum



Aldon Proprietary Information



Some Parts List – Anodization Parts (Sulphuric Anodization)

ALDON TECHNOLOGIES SERVICES PTE LTD

AMAT DPS-II

Item	Picture	Module	OEM P/N	Description	Tools	Material
1		ETCH	0021-19030 0021-26274	SCREEN, PHM	DPS II	Metal, Aluminum
2		ETCH	0021-13430 0021-26273	CATHODE LINER	DPS II	Metal, Aluminum
3		ETCH	0040-46003 0040-81158	LOWER CHAMBER LINER, PHM	DPS II	Metal, Aluminum
4		ETCH	0040-43977 0040-81155	LOWER CHAMBER LINER	DPS II	Metal, Aluminum
5		ETCH	0040-41703 0040-81165	SLIT VALVE DOOR	DPS II	Metal, Aluminum
6		ETCH	0040-63668 0040-41703	SLIT VALVE DOOR	DPS II	Metal, Aluminum
7		ETCH	0040-81156	UPPER CHAMBER LINER	DPS II	Metal, Aluminum
8		ETCH	0020-13660	HOOP SHADOW RING, PHM	DPS II	Metal, Aluminum



Aldon Proprietary Information



Some Parts List – Anodization Parts (Oxalic Anodization)

ALDON TECHNOLOGIES SERVICES PTE LTD

AMAT e-MAX (200)

Item	Picture	Module	OEM P/N	Description	Tools	Material
1		ETCH	0040-50414	DOOR, SLIT VALVE, WAFFLE-LESS, 200MM E-M	200eMAX	Metal, Aluminum
2		ETCH	0021-14960	DOOR, SLIT VALVE, WAFFLE-LESS, 200MM E-M	200eMAX	Metal, Aluminum
3		ETCH	0040-34866	LINER, CATHODE, MAG RING, WAFFEL-LESS, D	200eMAX	Metal, Aluminum
4		ETCH	0040-34865	LINER, DGDP, CHAMBER, WAFFLE-LESS, 200MM	200eMAX	Metal, Aluminum



Aldon Proprietary Information



Some Parts List – Anodization Parts (Oxalic Anodization)

ALDON TECHNOLOGIES SERVICES PTE LTD

AMAT MxP & SUPER-e

Item	Picture	Module	OEM P/N	Description	Tools	Material
1		ETCH	0010-30057	ASSEMBLY, CATHODE LINER, MXP+	MxP+, Super E	Metal, Aluminum
2		ETCH	0021-10223	LINER, CHAMBER, CLAMP LID	MxP+, Super E	Metal, Aluminum
3		ETCH	0021-09104	LINER, CATHODE, ALIGNED, OXIDE ETCH	MxP+, Super E	Metal, Aluminum
4		ETCH	0040-33998	LINER, SLIT LINER DOOR	MxP+, Super E	Metal, Aluminum
5		ETCH	0020-19003	INSERT, SLIT VALVE SHO	MxP+, Super E	Metal, Aluminum
6		ETCH	0020-34694 0020-34695	LINER, CHAMBER LINER, CATHODE	MxP+, Super E	Metal, Aluminum



Aldon Proprietary Information



Some Parts List – Anodization Parts (Sulphuric Anodization)

ALDON TECHNOLOGIES SERVICES PTE LTD

LAM 2300

Item	Picture	Module	OEM P/N	Description	Tools	Material
1		ETCH	796-098655-002	GDP, TOP COVER	Lam2300	Metal, Aluminum
2		ETCH	796-098654-002	GDP, RING	Lam2300	Metal, Aluminum
3		ETCH	715-801916-008	Chamber Liner	Lam2300	Metal, Aluminum
4		ETCH	715-801916-008	GDP	Lam2300	Metal, Aluminum
5		ETCH	715-801021-838	Chamber Liner	Lam2300	Metal, Aluminum




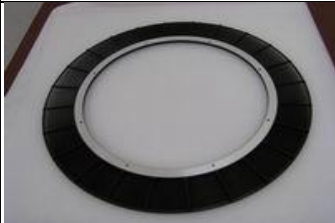

Aldon Proprietary Information



Some Parts List – Anodization Parts (Sulphuric Anodization)

ALDON TECHNOLOGIES SERVICES PTE LTD

TEL DRM

Item	Picture	Module	OEM P/N	Description	Tools	Material
1		ETCH	1D10-101475-11	Baffle Plate	TEL DRM	Metal, Aluminum
2		ETCH	1D10-101551-11	Baffle Plate / IBM	TEL DRM	Metal, Aluminum
3		ETCH	1D10-303124-21	Shield Depo	TEL DRM	Metal, Aluminum




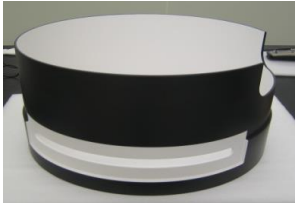

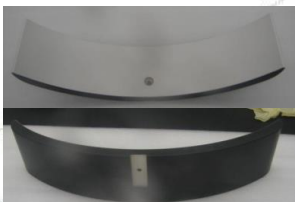
Aldon Proprietary Information



Some Parts List – Anodized with Y_2O_3 Parts

ALDON TECHNOLOGIES SERVICES PTE LTD

AMAT & LAM (300mm)

ITEM	OEM Part #	DESCRIPTION	MATERIAL	Photos
1	0021-17015	CATHODE SLEEVE	Al, partial coated Y2O3	
2	0040-99548	CHAMBER LINER LEFT	Al, partial coated Y2O3	
3	0040-99549	CHAMBER LINER RIGHT	Al, partial coated Y2O3	
4	0021-27883	SLIT DOOR ASSY	Al, partial coated Y2O3	



Aldon Proprietary Information