



RenoNix Ceramic Heater Profile

2020.09.03



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Company Compendium



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Ceramic Heater 2nd NEW Items



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RenoNix Major Customer

1-1. Company Profile

Established 04th November 2010

Business Semiconductor tools marketing, Refurbishment, Installation, Relocation, Conversion & Modification, Parts outsourcing, Technical Service, On call service & Technical Development & manufacturing

Capital 330K USD

Employee 16 Persons

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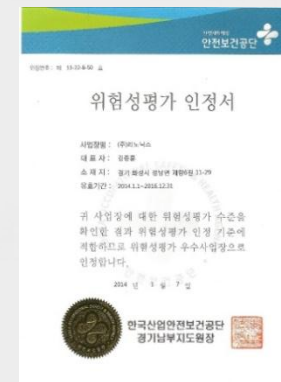
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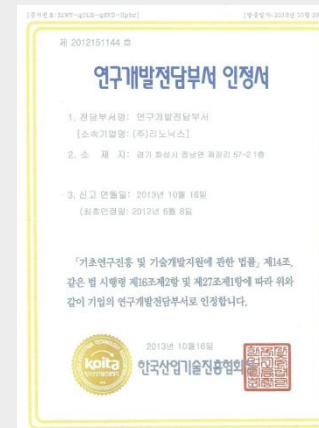
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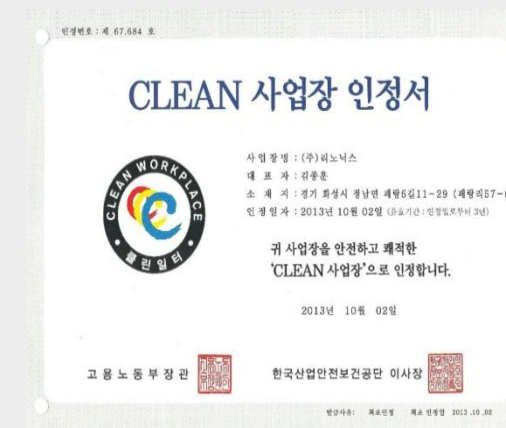
✓Enterprise Risk Management
13-22-B-50



✓Research Institute
2012151144



✓Clean Industry
67,684



1-2. Project Record (The Most Recent 3 Years)

Customer	Project Name	Brief Description	Q'TY	Year
Korea	DxZ PE SiH4 System Controller	Relocation	1	2019
Korea	4 CxZ Giga Fill Process Conversion From PSG to BPSG	Conversion	1	2019
Korea	Endura PCII Chamber Addition	Addition	1	2019
Korea	4 WxZ Chamber Dual Divert	Conversion	1	2019
Korea	HDP SPEED USG 3 Chamber	Relocation	1	2019
Czech	Endura Back Metal 4 Chamber	Refurbish & Set-up	1	2019
Korea	CxZ Chamber From Bottom RPS to Top RPS	Conversion	1	2019
Singapore	Endura System From 6" to 8"	Conversion	1	2019
Korea	CxZ Chamber From Bottom RPS to Top RPS	Conversion	1	2019
Korea	Endura Chamber From HTHU Heater to STF 4F Heater	Conversion	1	2018
Korea	4 DxZ PE TEOS Chamber	Refurbish & Set-up	1	2018
USA	2 WxZ Chamber, 2 WxP Chamber	Refurbish & Set-up	1	2018
Korea	4 WxZ Chamber Dual Divert	Conversion	1	2018
Korea	DLH PE SiH4 3 Chamber	Relocation	1	2018
Korea	AMAT Centura TPCC DPN	Refurbishment/Start up	1	2017
Singapore	AMAT Endura5500 Ai Cu	Refurbishment/Start up	1	2017
USA	AMAT Centura	Refurbishment	1	2017
Korea	AMAT Producer-S 200mm	Refurbishment	1	2017
Korea	AMAT Endura5500 MOCVD	Retrofit & Start up	1	2017
Korea	AMAT Centura WCVD	Refurbishment/Start up	1	2017

1-3. Project Record (The Most Recent 9 Years)

Summary list for project

Project Name	Endura	Centura	Producer	LAM / Novellus	TEL SCCM	DNS	Other	TOTAL
Refurbishment/ Start up	18	8	2	2	1	1	5	37
Retrofit / Start up	22	10	-	-	-	-	3	35
Relocation/ Start up	1	12	-	1	-	-	4	18
Refurbishment	6	2	2	-	1(Upgrade)	-	3	14
TOTAL (104)	47	32	4	3	2	1	15	104

Summary list for country

Country	Q'TY	Rate
Korea	54	52%
China	18	17%
Singapore	18	17%
Taiwan	8	8%
Other	6	6%
TOTAL	104	100%

1-4. Business Detail

Customer Satisfaction

Equipment Refurbish

- ✓ AMAT PVD / CVD / ETCH, LAM / Novellus ETCH / CVD, TEL ETCH / TRACK, DNS Scrubber, etc.
- System Refurbishment, Modification, Relocation, Upgrade & Conversion Start-up.

2nd / OPM NEW Overhaul Items

- ✓ LAM ESC 2nd NEW (150mm / 200mm)
- ✓ AMAT Magnet OPM NEW (200mm / 300mm)
- ✓ LAM Electrode OPM NEW
- ✓ Novellus Heater Block 2nd NEW (150mm / 200mm)
- ✓ WJ 999 / 1000 / 1500 EQUIP Parts 2nd NEW

Spare Parts

- ✓ OEM / OPM / 2nd New Parts
- ✓ OPM : LAM Electrode / Stud Socket / ESC / ALN Heater / Gasket etc.
- ✓ 2nd New : Ceramic Pin.
- ✓ Provide process kits for PVD, CVD, ETCH process chamber.
- ✓ AMAT / LAM / NOVELLUS DNS / TEL etc. system part.

2. AMAT Ceramic Heater 2nd NEW Items

➤ Performance for 200mm Ceramic Heater

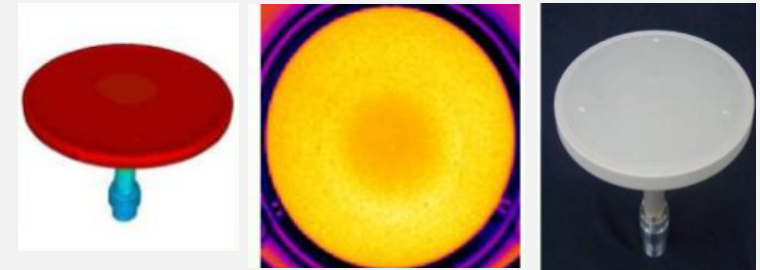
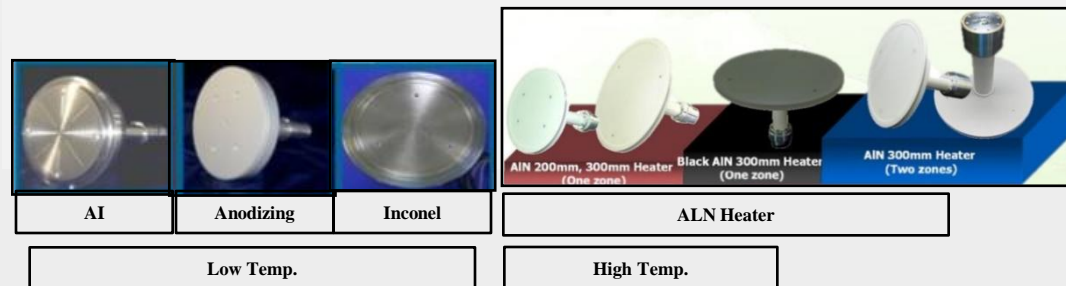


- 200mm Wafer Size
- Good Thermal Conductivity
- High Durability
- Excellent Corrosion Resistance
- Good Wafer Temperature at Various CVD Process

2. AMAT Ceramic Heater 2nd NEW Items

➤ Key Features and Advantages.

- Good Thermal Conductivity (1080W / m.K)
- Maximum Operating Temperature 800 Degree
- High Durability
- Excellent Corrosion Resistance
- Tested for HARP & TEOS process in SK HYNIX
- Heater Design Through the CFD
- Durable Brazing Technologies for Electrodes and RF grounding
- ESC function added heater



2. AMAT Ceramic Heater 2nd NEW Items

➤ The following Producer / Centura Heater could be provided by RenoNix.

➤ Producer 2nd NEW Ceramic Heater List

Part No.	Description
0010-03841 / 04978 / 08901 0010-12282 / 17871 / 25323 0010-25415 / 29675 / 38516 0010-03287	200mm Producer Ceramic Heater 0010-03840
0190-03506, 0200-37359 0040-51612	200mm Producer Ceramic Heater
0040-02539 / 37593 / 39947 0040-61254 / 86625	200mm Producer Cer. Heater AL Cap#
0040-45008 / 47318 / 61269 0040-70479 / 86263 / MF612 0200-200MC / 35527	200mm Producer Cer. Heater Plate#
0190-01168 / 35986	TC Assy for 200mm Producer Cer. Heater

➤ Centura 2nd NEW Ceramic Heater List

Part No.	Description
0010-03843	200mm CxZ Ceramic Heater (Giga fill ALN Heater)
0040-00939 0040-36219	200mm DCxZ Cer. Heater AL Cap# (Giga fill ALN Heater)
0040-37010	200mm DCxZ Cer. Heater Plate# (Giga fill ALN Heater)
0190-01167	TC Assy for 200mm DCxZ Ceramic Heater
0010-11491	ASSY, HEATER, 200MM WXZ CERAMIC RING, OSCR (THERMOCOUPLE INCLUDED)



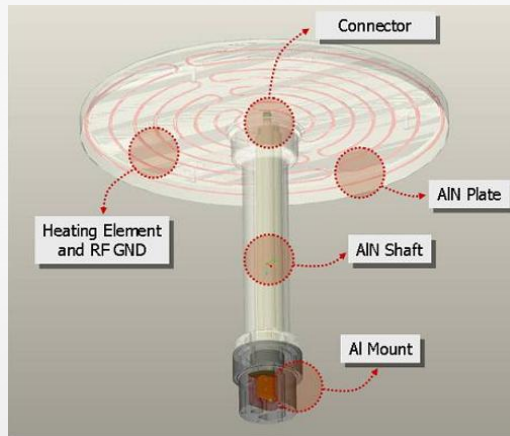
2. AMAT Ceramic Heater 2nd NEW Items

➤ 200mm Producer & CxZ Ceramic Heater General Information.

Item		Material or Method		
Materials	Heater Plate	- Material : Aluminum Nitride		
	Heater Shaft	- Material : Aluminum Nitride		
	Heating Element	- Material : Molybdenum		
		- Type : C - Type		
	RF Ground Layer	- Material : Molybdenum		
		- Type : Electrode of mesh – shape (or none)		
	Impurity	Element	Unit	Spec.
		C	Ppm	130 ~ 320
		Ca	Ppm	10 ~ 240
		Si	Ppm	9 ~ 48
Fe		ppm	2 ~ 14	
Thermal Conductivity	- High Level : 180 W (m*K) - Middle Level : 150 W (m*K) - Low Level : 70 W(m*K)			
Joining Method	Shaft Bonding	Diffusion Bonding		
	Power Terminal	Brazing Method		

2. AMAT Ceramic Heater 2nd NEW Items

➤ ALN Heater Structure



ALN Properties

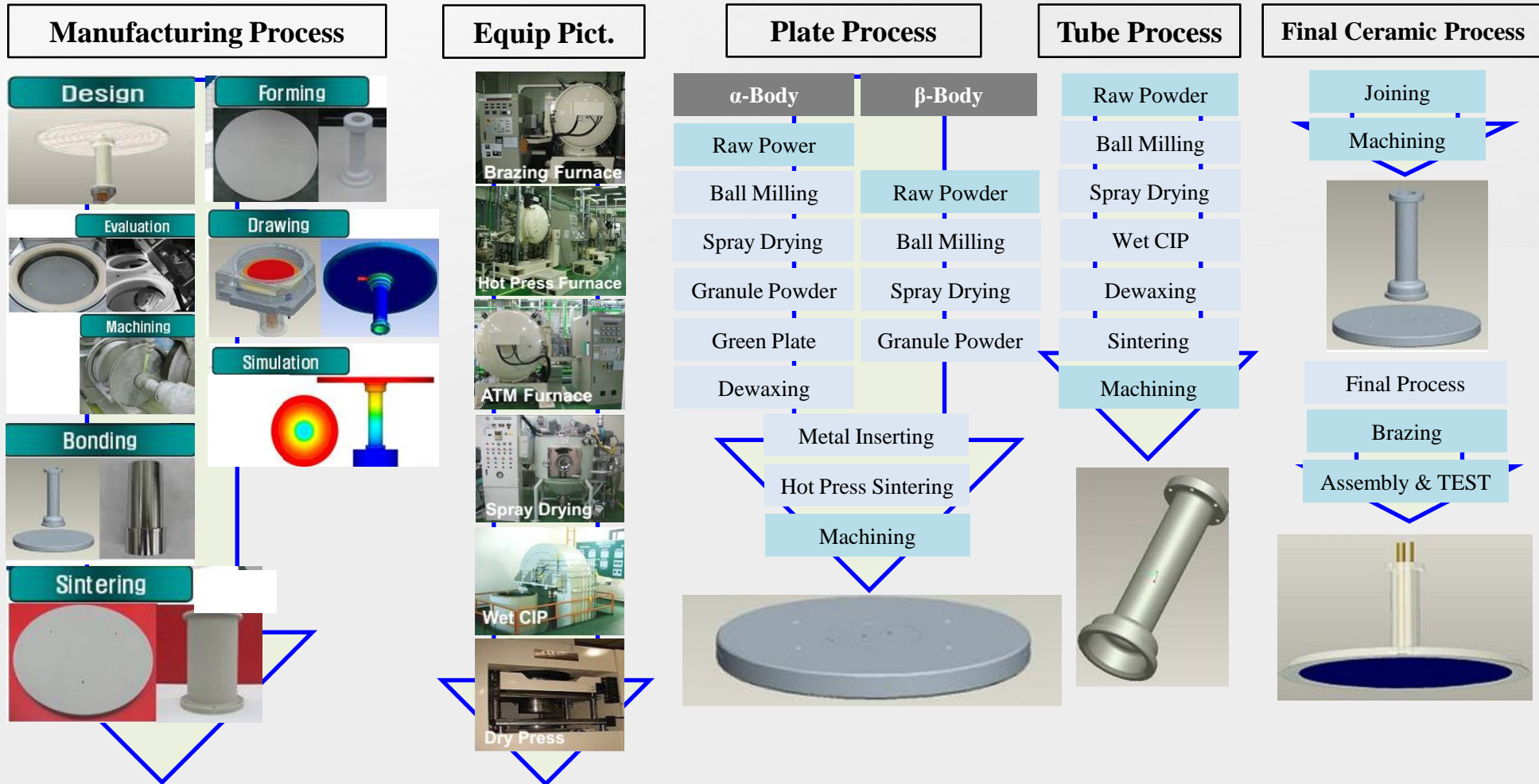
Item	Unit	ALN T1	ALN H1
Color	-	Gray	Black
Coefficient of Thermal Expansion	K ⁴	4.3 * 10 ⁻⁶	6.0*10 ⁻⁶
Thermal Conductivity	W/m K	170 ~ 190	
Volume Resistivity	Ω·cm	10 ¹⁴	10 ¹⁶
Dielectric Constant	-	9.1	8.7

➤ Specification for ALN Heater

NO.	Items	Specification		Remarks
		1 Zone	2 Zone	
1	Application Wafer	200mm, 300mm		-
2	Operation Temperature Range	R.T ~ 650 °C		-
3	Temperature Uniformity	≤ 1% (200mm) ≤ 2% (300mm)		@ Test Chamber Setting temp.: 550 Chamber pressure : 5.5 Torr, Inert Gas
4	Temperature Ramping Up Speed	≤ 9 °C / min		@ Coolant
5	Power	208 VAC	In : 208 VAC Out : 208VAC	2 Zone (Outer Ratio Control)
6	Resistance	1 ~ 7 Ω	In : 1 ~ 5 Ω Out : 1 ~ 5 Ω	-
7	Insulation Resistance	≥ 2 GΩ		Insulation Layer, @ R. T
8	Leakage Current	≤ 50 mA		Insulation Layer, @ 550°C
9	He Leakage Rate	≤ 5 x 10 ⁻⁸ mbar ·l/sec		Bonded Area

2. AMAT Ceramic Heater 2nd NEW Items

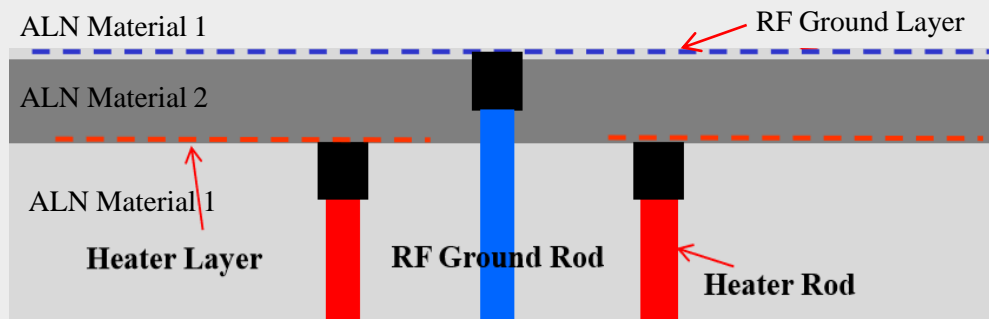
➤ Ceramic Heater Manufacturing Process



2. AMAT Ceramic Heater 2nd NEW Items

➤ ALN Material Comparison

Item	Material Model	Product	Ref.
Flexural Strength. (Mpa)	ALN Material 1	337	320 ~ 370
	ALN Material 2	359	320 ~ 370
Volume Resistivity @ R. T, (Ω cm)	ALN Material 1	1.00E + 15	1.00E + 15
	ALN Material 2	1.00E + 16	1.00E + 15
Thermal Conductivity @ R. T, W (m * k)	ALN Material 1	180	150 ~ 180
	ALN Material 2	150	150 ~ 180



➤ ALN Heater Final Inspection Report

Final Inspection Report					
■ INFORMATION					
Customer	-	Inspection Date	2016/10/28		
Part Name	200mm ALN Heater	Serial No.	-		
Part No.	0010-25415 / 0010-03840	Inspector	Kim		
Mode	NEW	Revision No.	00		
■ INSPECTION					
	Inspection Item	Spec.	Result	Judgement	
Dimension	Diameter of Plate	237.0 ± 0.2mm	237.08 mm	OK	
	Parallelism	≤ 0.02 mm	0.01 mm	OK	
	Depth of wafer pocket	0.8 ± 0.1 mm	0.84 mm	OK	
	Flathness on Top	≤ 0.05 mm	0.03 mm	OK	
	Height of Embossing	10.0 ± 2.5 μ m	11.7 μ m	OK	
	Surface roughness on Embossing	0.4 ~ 1.0 μ m	0.72 μ m	OK	
Visual	Crack Spot, Scratch, Discolor	Specification	Pass	OK	
Function	Heater Resistance	2.0 ± 0.5 Ω	1.7 Ω	OK	
	Capacitance of upper dielectric	1.5 ± 0.5nF	1.4816 nF	OK	
	Leak test after assemble AI Mount	≤ 5.0 E-9 mbar - l/s	3.1 E-9 mbar - l/s	OK	
	Chamber Leak Rate	≤ 5 mT/min.	0.8 mT/min.	OK	
■ Heating Test [550 °C / 5 Torr / Unif. ≤ 2 %]					
	No.	Data	No.	Data	QC Pass
	1	511.3	2	520.5	
	3	521.5	4	514.7	Approver
	5	523.9	6	517.9	
	7	521.8	8	522.8	
	9	512.8	Avg.	518.5	
	ΔT	12.6	Unif.	1.2	

RenoNix Major Customer

ON Semiconductor®



Dongbu HiTek
Agricultural Business

SILTERRA

UMC-SG

SSMC



em microelectronic

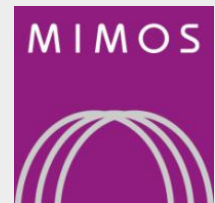


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JCET CHANGJIANG ELEC. TECH.

HEJIAN



Contact Point

**We're Capable of Most of service for PVD,CVD, ETCH areas.
If you have any inquiry or interest , please feel free to contact us.**



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