



RenoNix Heater Block Profile

2020.09.03



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Company Compendium



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Heater Block 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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Tel +82 31 354 9494

Fax +82 31 354 9323

E-Mail renonix@irenonix.com

Web Site www.irenonix.com

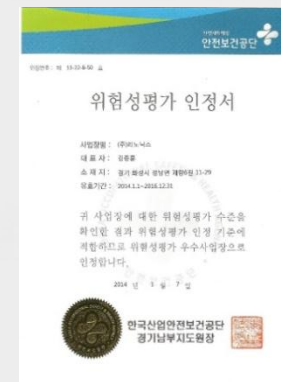
✓ISO9001
QAIC/KR/4291-B



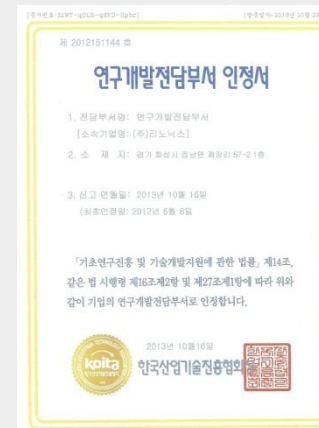
✓ISO14001
QAIC/KR/4292-B



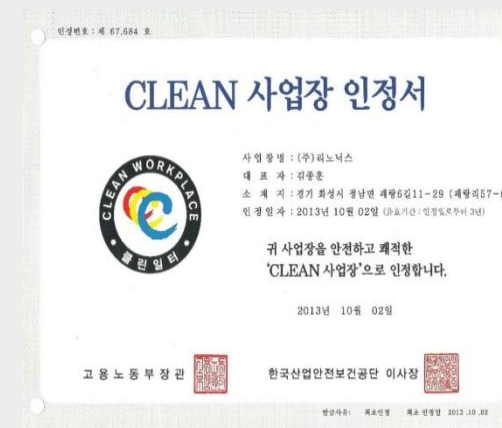
✓Enterprise Risk Management
13-22-B-50



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

2nd / OPM NEW Overhaul Items

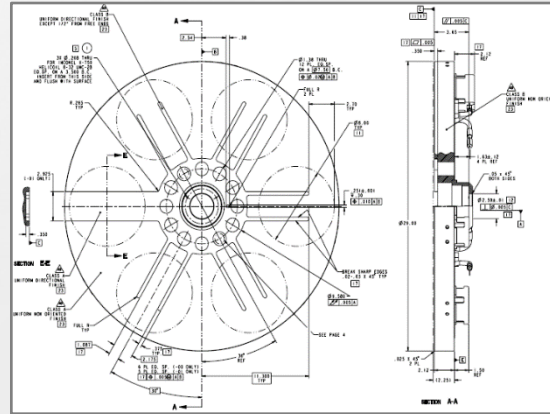
- ✓ ESC 2nd NEW (150mm / 200mm)
- ✓ Magnet OPM NEW (150mm / 200mm)
- ✓ Ceramic Heater 2nd NEW
- ✓ Shower Head OPM NEW (200mm / 300mm)
- ✓ WJ 999 / 1000 / 1500 EQUIP Parts 2nd NEW

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. LAM / Novellus C1 / C2 Heater Block

➤ LAM / Novellus Heater Block BKM Drawing as Below.



Recently, domestic product of heater block used in Novellus C1, C2 Process has shown fail trend during Production.

The following problem has shown during production.

- ◆ *System up time decrease*
- ◆ *Cost Increase*
- ◆ *Lower Quality*
- ◆ *PM time Increase*

Therefore, RenoNix here to introduce an product which has qualified by other foundries.

2. LAM / Novellus C1 / C2 Heater Block

➤ The following Novellus C1 / C2 Standard Heater Block could be provided by RenoNix.

➤ H/B 2nd NEW & Overhaul List

P/N	Description
19-00155-01	HBLK, 150mm, SLOT
19-00154-00	HBLK, 200mm
02-258799-00	HBLK, 200mm
19-00154-01	HBLK, 200mm, SLOT
19-00154-02	HBLK, 200mm, 24 HOLE
19-024227-00	HBLK, 200mm, 24 HOLE
19-024227-02	HBLK, 200mm, 4 HOLE
19-024227-01	HBLK, 200mm, SLOT, 20 HOLE
02-265577-00	HBLK, 200mm, SPL HTR, 4 HOLE
02-335438-00	HBLK, 200mm, SLOT, 4 HOLE, SCRIBED
16-131278-00N	HBLK, 200mm, 18 HOLE, SLD SPRT, EXT BAKE
19-00154-00N	HBLK, 200mm, EXT BAKE
19-032015-01	HBLK, 150mm, SLOT, 28 HOLE
19-032015-02	HBLK, 150mm, SLOT, 4 HOLE
19-00155-00	HBLK, 150mm
19-027010-00	HBLK, 150mm, 3 BALL

2. LAM / Novellus C1 / C2 Heater Block

➤ RenoNix H/B Material Characteristics



Vista Metals Corp
13425 Whittram Ave
Fontana, CA 92335
(909)823-4278

Certificate of Inspection and Conformance

Test Method: ASTM E-1251 & QP10-C2

Certified report of chemical analysis
(all values are percent concentration)

Alloy: 6061	Size: 14.5"																			
Cast	AL	SI	FE	CU	MN	MG	CR	NI	ZN	V	TI	PB	SN	NA	B	ZR	LI	CA	S	BI
F70844	97.46	0.60	0.33	0.26	0.07	0.56	0.15	0.01	0.05	0.0230	0.03	0.002	0.0003	0.0002	0.0026	0.00	0.0001	0.0049	0.004	0.0027

**Analyzed AL
ingredient of
raw material as below.
it's shown 97.46%**

Applicable Specs:

Vista Metals Corp certifies that the material in this shipment meets the requirements of all the applicable specifications/purchase order and verifiable evidences of inspections and testing is available for inspection. The test report shall not be reproduced except in full, without the written approval of the laboratory. The recording of false, fictitious or fraudulent statements or entries on the certificate may be punished as a felony under law.

Made in the U.S.A. VM
43

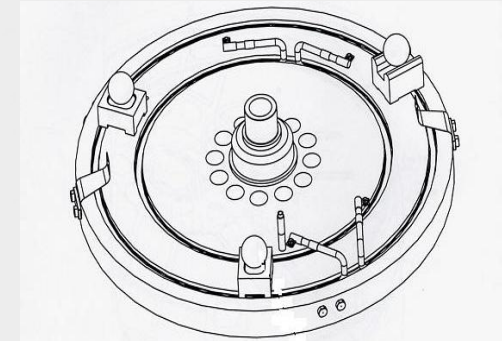
Submitted by: *Robert Mates*
Q.C. Stamp: *NOV 8 0 2012* Signature: *NOV 8 0 2012*

Page 1 of 1

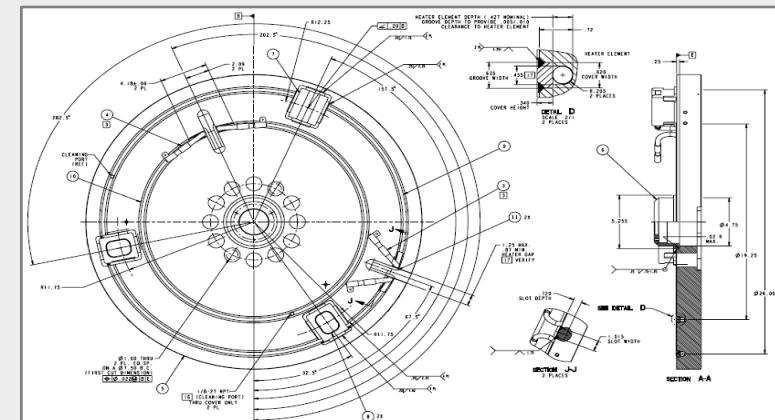
QR3-08 Rev.10/09/11

ITEM	OEM(%)	RenoNix(%)
Al	97.22	97.46
Cu	0.25	0.26
Si	0.68	0.60
Mg	1.03	0.96
Zn	0.05	0.09
Fe	0.46	0.33
Mn	0.07	0.07
Ni	0.004	0.01
Ti	0.02	0.03
Pb	0	0.002
Sn	0.02	0.0003
Cr	0.1	0.15
Etc.	0	0.038
TOTAL		100%

C1 Heater Block Dimension



C2 Heater Block Dimension



2. LAM / Novellus C1 / C2 Heater Block

➤ Heater Element Resistor Analyze

RenoNix 2KW Heater Inner Resistance (OEM Inner Resistance Spec : $6\Omega \sim 7.5\Omega$)

ITEM	$\phi 448.7 \pm 6.35$	27 ± 4	101.6 ± 3	$\phi 10.9 \pm 0.05$	53.8 ± 1	High-Voltage Insulation Test Terminal 100°C DC 1000V > 000MΩ	Resistance Test $6.2 \sim 7.7\Omega$	Visual Inspection
1	OK	OK	OK	OK	OK	OK	6.9Ω	OK
2	OK	OK	OK	OK	OK	OK	6.9Ω	OK

RenoNix 3KW Heater Outer Resistance (OEM Outer Resistance Spec : $4\Omega \sim 5\Omega$)

ITEM	$\phi 660 \pm 12.7$	27 ± 4	101.6 ± 3	$\phi 10.9 \pm 0.05$	53.8 ± 1	High-Voltage Insulation Test Terminal 100°C DC 1000V > 000MΩ	Resistance Test $4.1 \sim 5.2\Omega$	Visual Inspection
1	OK	OK	OK	OK	OK	OK	4.6Ω	OK
2	OK	OK	OK	OK	OK	OK	4.6Ω	OK

2. LAM / Novellus C1 / C2 Heater Block

➤ C1 New Product Test & Inspection Item

Test & Inspection	<ol style="list-style-type: none"> 1. Heat up test(O.K) 2. Heater insulation test (O.K) 3. Heater current resistance test (O.K) 4. Confirm the sealing status of heater terminal (O.K) 5. All dimension check (O.K) 6. Assmebling and fitting point check with real counter part sample (O.K) 7. Serial No. engraving check (O.K) 8. Cleaning Status check (O.K) 9. Anodizing insulation resistance (O.K) 10. Vacuum Packing Status check (O.K)
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➤ C/P Inspection Report

Novellus Heater Block

PART'S NAME	Novellus Heater Block	PART NO	19-00155-01
MATERIAL	Al 6061-T6	INSPECTION	20140911
MN/NO	0	SN	20140912

CHECKING POINT INSPECTION REPORT

Checking Point	Spec	Final Inspection Result	Appearance
B-1	63.5 \pm 0.03 mm	63.56	⊙ Crack OK
B-2	92.71 \pm 0.03 mm	92.70	
C-1	ϕ 7.00 \pm 0.05, -0.00 mm \geq 8.10 mm	7.0 / 3883	⊙ Impurity OK
C-2	ϕ 7.00 \pm 0.05, -0.00 mm \geq 8.10 mm	7.0 / 3885	
Height (H1)	139.7 \pm 0.2mm	139.76	⊙ Cracking OK
Height (H2)	139.7 \pm 0.2mm	139.85	
Height (H3)	145.8 \pm 0.3, -0.0mm	146.04	
H1 H2 H3 Position	Diagram	OK	
R3 Strap Screw Hole Position	Installation of Test Tools	OK	

➤ Final Inspection Report

Novellus Heater Block

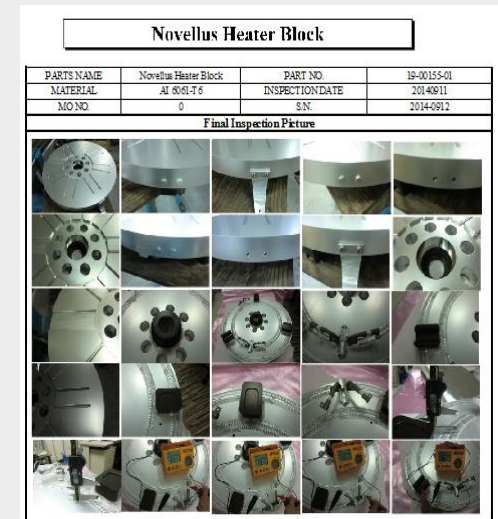
PART'S NAME	Novellus Heater Block	PART NO	19-00155-01
MATERIAL	Al 6061-T6	INSPECTION	20140911
MN/NO	0	SN	20140912

FINAL INSPECTION REPORT

Checking Point	Spec	Final Inspection	Appearance
A-1 ~ A-12	Original: 8.89 \pm 0.1mm Repair: 9.00 \pm 0.1mm	8.90	⊙ Crack OK
A-13 ~ A-24	Original: 599.04 \pm 0.10mm ϕ 52.2 \pm 0.10mm	599.44 / 52.1	
A-25	Original: 74.30 \pm 0.10mm 8.89 \pm 0.20mm -0.10	74.30 8.90	

Point	(1)	(2)	(3)	(4)	(5)	Appearance
	Flattness Max. 0.2mm	Max. 0.2mm	Max. 0.2mm	Max. 0.2mm	Max. 0.2mm	

➤ Final Inspection Picture



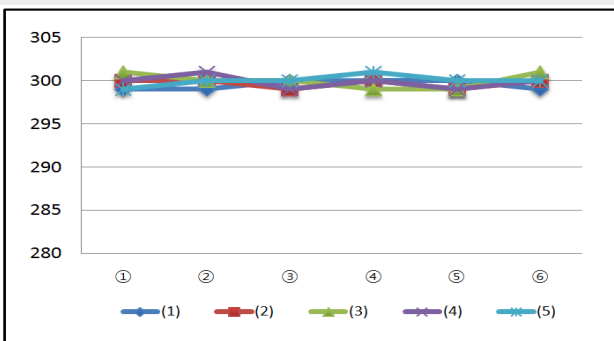
2. LAM / Novellus C1 / C2 Heater Block

➤ C1 Heater Block Station Temperature Mapping

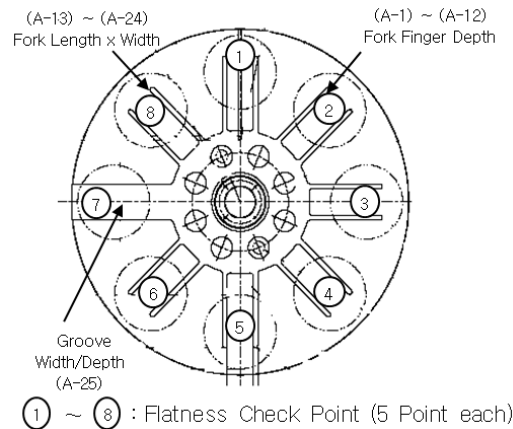
OEM New Heater Block

Temperature 300°C	(1)	(2)	(3)	(4)	(5)
①	299°C	300°C	301°C	300°C	299°C
②	299°C	300°C	300°C	301°C	300°C
③	300°C	299°C	300°C	299°C	300°C
④	300°C	300°C	299°C	300°C	301°C
⑤	300°C	299°C	299°C	299°C	300°C
⑥	299°C	300°C	301°C	300°C	300°C

ITEM	MAX TEMP	MIN TEMP	RANGE±
①	301°C	299°C	2°C
②	301°C	299°C	2°C
③	300°C	299°C	1°C
④	301°C	299°C	2°C
⑤	300°C	299°C	1°C
⑥	301°C	299°C	2°C



Heater Block time-up condition
Room Temp : 300°C

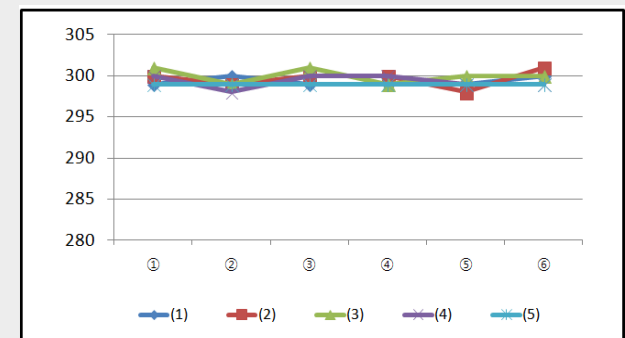


1. H/B Time-up Condition
2. Temperature Ramp up
Time : 24Min

RenoNix 2nd New Heater Block

Temperature 300°C	(1)	(2)	(3)	(4)	(5)
①	299°C	300°C	301°C	300°C	299°C
②	300°C	299°C	299°C	298°C	299°C
③	299°C	300°C	301°C	300°C	299°C
④	299°C	300°C	299°C	300°C	299°C
⑤	299°C	298°C	300°C	229°C	299°C
⑥	300°C	301°C	300°C	299°C	299°C

ITEM	MAX TEMP	MIN TEMP	RANGE±
①	301°C	299°C	2°C
②	300°C	298°C	2°C
③	301°C	299°C	2°C
④	300°C	299°C	1°C
⑤	300°C	298°C	2°C
⑥	301°C	299°C	2°C



2. LAM / Novellus C1 / C2 Heater Block

➤ C1 Final Test Item & Spec

NO.	ITEM	SPEC
1	Heater Block Part No.	C1 Novellus All Model
2	TEMP Set Point	400°C
3	Heating	24 Min
4	Natural Cooling	330Min
5	Anodizing Thickness	40um±10um
6	Height (H1)	139.7 ± 0.2mm
7	Height (H2)	139.7 ± 0.2mm
8	Height (H3)	148.8 +0.3, -0.0mm
9	Inner Heater Resistance	6.2Ω ~ 7.7Ω
10	Outer Heater Resistance	4.1Ω~5.2Ω
11	Check Point Spec	Refer to Checking Point Inspection Report

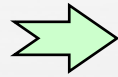
2. LAM / Novellus C1 / C2 Heater Block

➤ C1 Test Photo

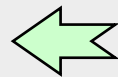
Heat-Up Test Flow



Power Liner Connection

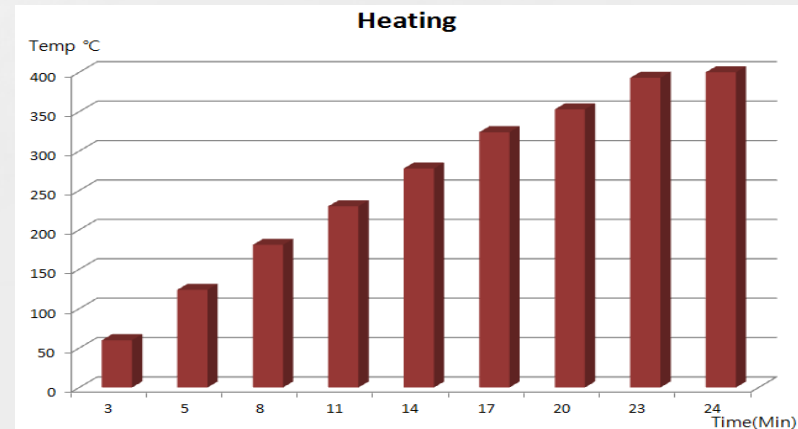


Check the Temp-Time curve

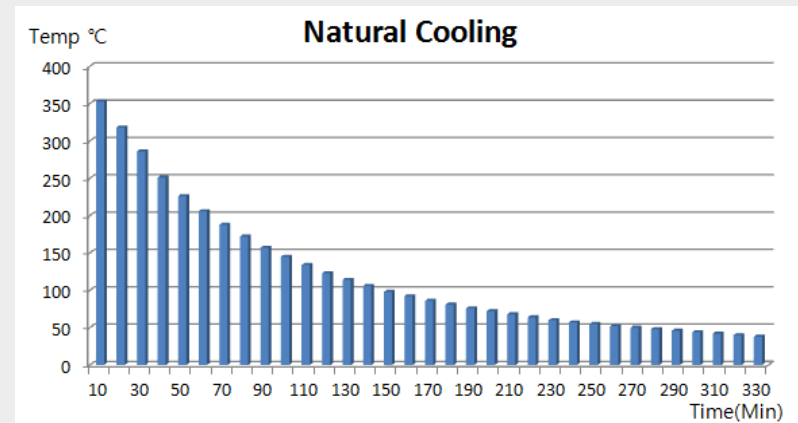


Power Switch - ON and heating up

➤ Temperature Heating Profile



➤ Natural Cooling test result



2. LAM / Novellus C1 / C2 Heater Block

➤ C2 New Product Test & Inspection Item

Test & Inspection	<ol style="list-style-type: none"> 1. Heat up test(O.K) 2. Heater insulation test (O.K) 3. Heater current resistance test (O.K) 4. Confirm the sealing status of heater terminal (O.K) 5. All dimension check (O.K) 6. Assmebling and fitting point check with real counter part sample (O.K) 7. Serial No. engraving check (O.K) 8. Cleaning Status check (O.K) 9. Anodizing insulation resistance (O.K) 10. Vacuum Packing Status check (O.K)
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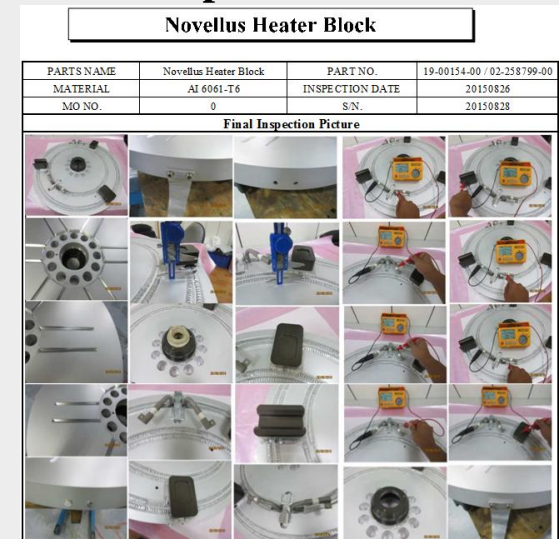
➤ C/P Inspection Report

Novellus Heater Block			
PARTS NAME	Novellus Heater Block	PART NO.	19-00154-00 / 02-258799-00
MATERIAL	Al 6061-T6	INSPECTION	20150826
MINNO.	0	S.N.	20150828
CHECKING-POINT INSPECTION REPORT			
Checking Point	Spec	Final Inspection Result	Appearance
B-1	63.53±0.03 mm	63.55	⊙ Crack ⊙ Impurity ⊙ OK
B-2	92.71±0.5 mm	92.94	
C-1	φ7.00+0.05,-0.00 mm >=8.10 mm	7.04 / 58.47	
C-2	φ7.00+0.05,-0.00 mm >=8.10 mm	7.04 / 58.28	
Height (H1)	139.7 ± 0.2mm	139.63	⊙ Impurity ⊙ OK
Height (H2)	139.7 ± 0.2mm	139.75	
Height (H3)	148.3 ± 0.3,-0.0mm	148.92	
H1 H2 H3 Position	Diagram	OK	
RF Strap Screw Hole Position	Installation of Test Tools	OK	

➤ Final Inspection Report

Novellus Heater Block						
PARTS NAME	Novellus Heater Block	PART NO.	19-00154-00 / 02-258799-00			
MATERIAL	Al 6061-T6	INSPECTION	20150826			
MINNO.	0	S.N.	20150828			
FINAL INSPECTION REPORT						
Checking Point	Spec	Final Inspection Result	Appearance			
A-1 ~ A-12	Original: 8.89 ± 0.1 mm; 9.00 ± 0.1 mm	9.00	⊙ Crack ⊙ Impurity ⊙ OK			
A-13 ~ A-14	Original: 574.04±0.10mm; 9.50±0.10mm	573.04 / 9.5				
A-25 ~ A-28	φ 6.60 ± 0.10,-0.05mm; 3.17±0.05mm	N/A				
Flatness	Max. 0.2mm	Max. 0.2mm	Max. 0.2mm	Max. 0.2mm	Max. 0.2mm	Under 0.1mm by NC machining

➤ Final Inspection Picture



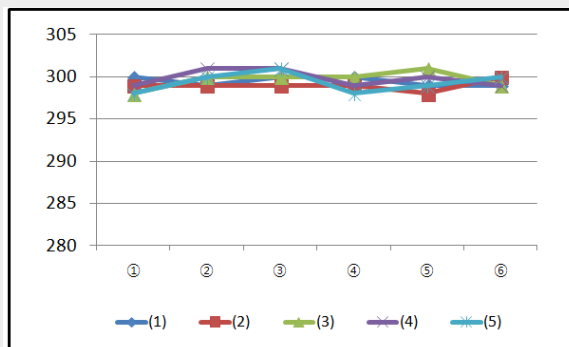
2. LAM / Novellus C1 / C2 Heater Block

➤ C2 Heater Block Station Temperature Mapping

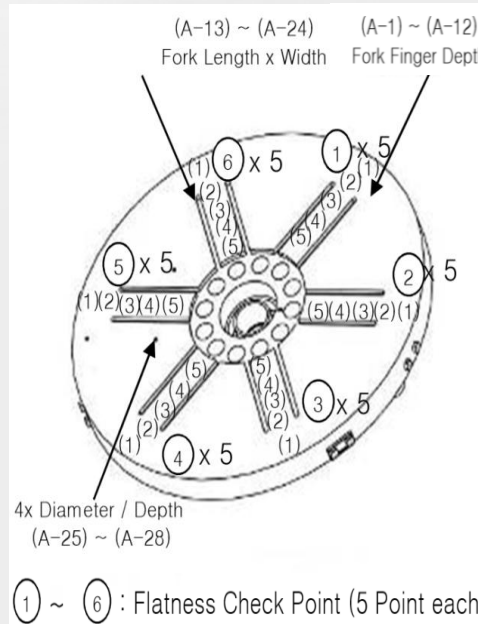
OEM New Heater Block

Temperature 300°C	(1)	(2)	(3)	(4)	(5)
①	300°C	299°C	298°C	299°C	298°C
②	299°C	299°C	300°C	301°C	300°C
③	300°C	299°C	300°C	301°C	301°C
④	300°C	299°C	300°C	299°C	298°C
⑤	299°C	299°C	301°C	300°C	299°C
⑥	299°C	300°C	299°C	299°C	300°C

ITEM	MAX TEMP	MIN TEMP	RANGE±
①	300°C	298°C	2°C
②	301°C	299°C	2°C
③	301°C	299°C	2°C
④	300°C	298°C	2°C
⑤	301°C	299°C	2°C
⑥	300°C	299°C	1°C



Heater Block time-up condition
Room Temp : 300°C

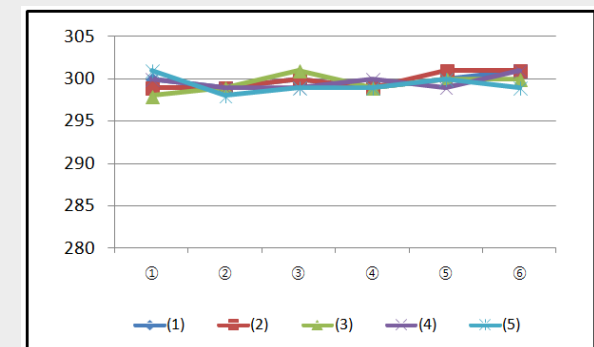


1. H/B Time-up Condition
2. Temperature Ramp up
Time : 2.5 ~ 4HRS

RenoNix 2nd New Heater Block

Temperature 300°C	(1)	(2)	(3)	(4)	(5)
①	300°C	299°C	299°C	300°C	301°C
②	299°C	299°C	299°C	299°C	298°C
③	300°C	300°C	301°C	299°C	299°C
④	299°C	299°C	299°C	300°C	299°C
⑤	300°C	301°C	300°C	299°C	300°C
⑥	301°C	301°C	300°C	301°C	299°C

ITEM	MAX TEMP	MIN TEMP	RANGE±
①	301°C	299°C	2°C
②	300°C	298°C	1°C
③	301°C	299°C	2°C
④	300°C	299°C	1°C
⑤	301°C	299°C	2°C
⑥	301°C	299°C	2°C



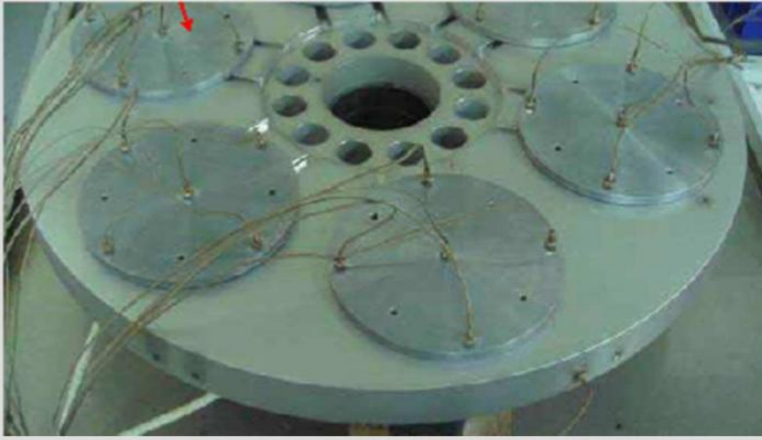
2. LAM / Novellus C1 / C2 Heater Block

➤ C2 Final Test Item & Spec

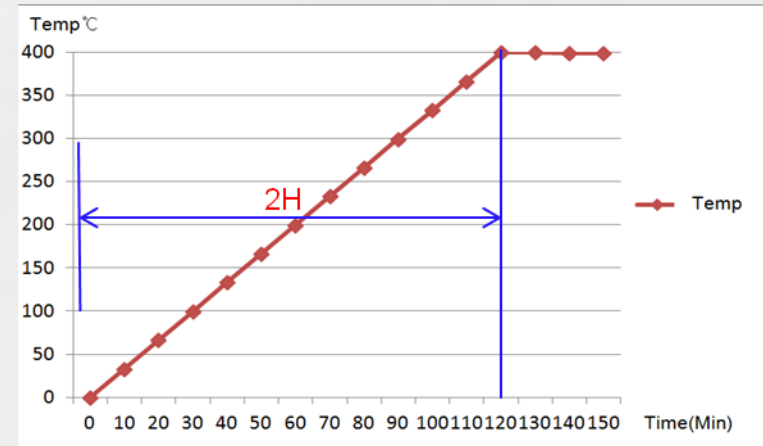
NO.	ITEM	SPEC
1	Equipment Maker	LAM / NOVELLUS
2	Equipment Model No.	C2 SEQUEL
3	Heater Block Part No.	C2 Novellus All Model
4	TEMP Set Point	400°C
5	Test Point	4 Point
6	Test Time	40minite
7	Ramp Up Time	2H
8	Inner Heater Resistance	6.2Ω ~ 7.7Ω
9	Outer Heater Resistance	4.1Ω~5.2Ω
10	Check Point Spec	Refer to Checking Point Inspection Report
11	Wafer Temperature Distribution	Refer to Next Page Photo

2. LAM / Novellus C1 / C2 Heater Block

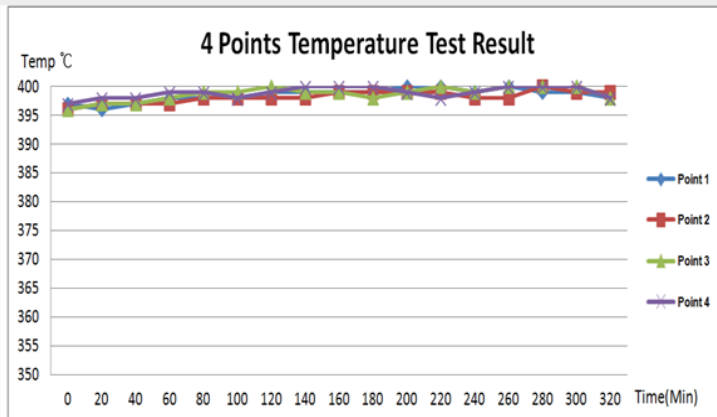
➤ C2 Test Photo



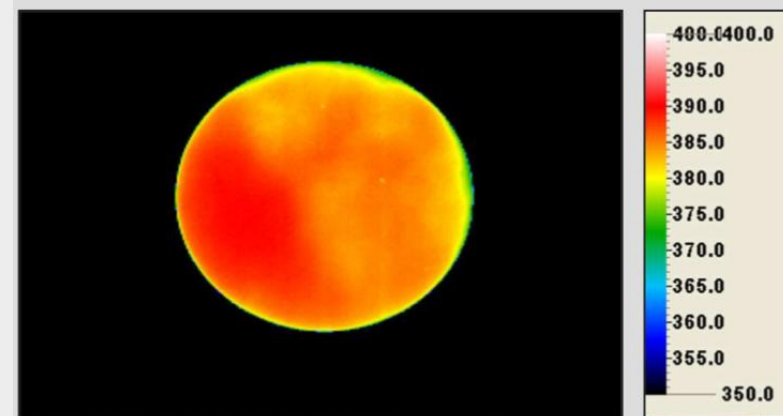
➤ Temperature Heating Profile



➤ 4 Points temperature test result



➤ Wafer temperature distribution



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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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