

TO :

Halogen Free Part

## SPECIFICATION FOR APPROVAL

DESCRIPTION : 0.5PH M.2 H2.3 M-KEY;

CUSTOMER P/N :

LOTES P/N : APCI0146-P001A

CUSTOMER APPROVAL SIGN :

SEND BY	QA CONFIRM	R&D CONFIRM	PREPARE BY
		Barney	Jason



Lotes SZ



Lotes GZ



Lotes TW

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# LOTES CO., LTD

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PRODUCT SPECIFICATION		REV	ECN No.
		1C	SN14***
<b>DIMENSION</b> 1.This specification covers M.2 connector. 2.The physical dimensions and the M.2 connector are shown in drawing.			
<b>MATERIAL AND FINISH</b> 1.Housing: High temperature thermoplastic, Color: Black; 2. Contact: Copper Alloy, 50-120u” Nickel under plated, Au on contact area, Matte Tin on soldering area; 3. SMT TAB: Steel, 50-120u”Nickel under plated, plating Matte Tin over all;			
<b>OPERATING PERFORMANCE</b> 1.Operation Temperature: -55℃ to 85℃ 2.Voltage Rating: 30V 3.Current Rating: 0.5A			
<b>ELECTRICAL PERFORMANCE</b>			
Test item	Test condition	Requirements	
Examination of product	• Visual inspection	• No physical damage	
Low Level Contact Resistance	• EIA-364-23 • Mate connectors: apply a current of 10mA(Max) at open circuit voltage of 20mVvoltage(Max)	• Initial 55mΩ Max. • Final Δ LLCR =20mΩ Max.	
Insulation resistance	• Applying 500VDC for one minute between adjacent contacts of unmated connectors EIA-364-21	• 500MΩ Min.	
Dielectric withstanding voltage	• Measured by applying 300V/AC for one minute between adjacent contacts of unmated connector assemblies. EIA-364-20	• No breakdown or flash • Current leakage: 0.5 mA	
Temperature rise versus current	• The temperature rise above ambient shall not exceed 30℃ .the ambient condition is still air at 25℃ . EIA-364-70 Method 2	• No physical damage • Δ T=30℃ Max.	
LOTES CO., LTD		<b>PRODUCT NAME:</b> M.2 CONNECTOR	
		<b>DOCUMENT No:</b> SP-APCI0018	<b>REV:</b> 1C
		<b>PAGE:</b> 1 OF 5	
		<b>APPROVED BY:</b> Barney	<b>CHECKED BY:</b> Vito
		<b>WRITTEN BY:</b> TAN ZHI WU	

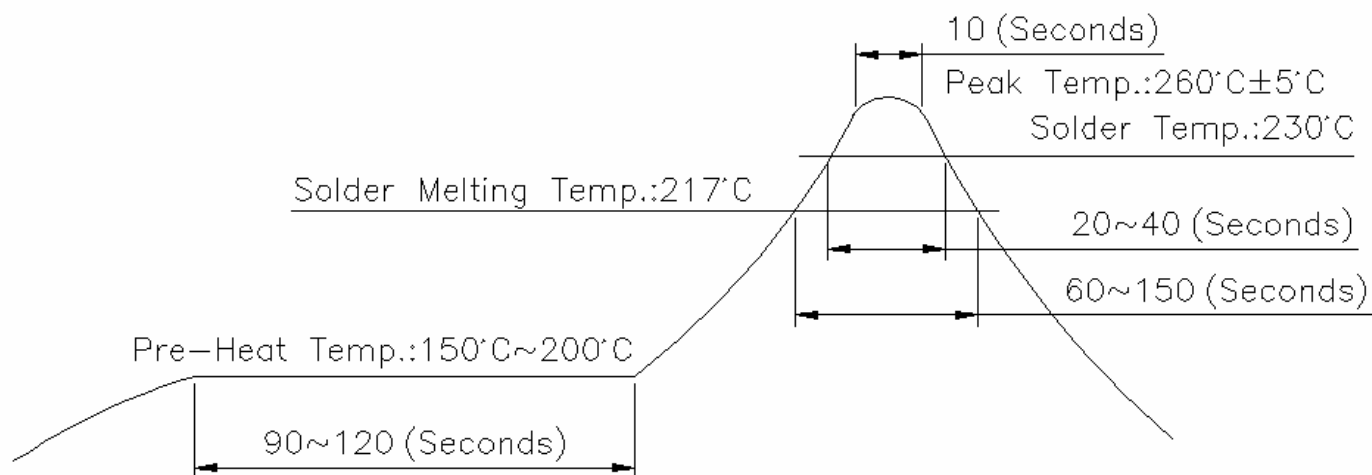
PRODUCT SPECIFICATION		REV	ECN No.
		1C	SN14***
<b>MECHANICAL PERFORMANCE</b>			
Test item	Test condition	Requirements	
Vibration test	<ul style="list-style-type: none"> <li>EIA-364-28, test condition VII, test condition letter D( 15 minutes in each of 3 mutually perpendicular directions . Both mating halves should be rigidly fixed so as not to contribute to the relative motion of one contact against another . The method of fixturing should be detailed in the test report)</li> </ul>	<ul style="list-style-type: none"> <li>No electrical discontinuity greater than 1 microsecond.</li> <li><math>\Delta</math>LLCR=20m<math>\Omega</math> Max.(Final)</li> </ul>	
Mechanical shock	<ul style="list-style-type: none"> <li>250 G (Ultra-book) and 285 G (Tablet) at 2m Sec half sine on all six axis</li> </ul>	<ul style="list-style-type: none"> <li>No electrical discontinuity greater than 1 microsecond</li> <li><math>\Delta</math> LLCR=20m<math>\Omega</math> Max.(Final)</li> <li>No physical damage</li> </ul>	
Insertion/Removal Force	<ul style="list-style-type: none"> <li>Insertion Force-20 N (2.04 kgf) Max. Removal Force-Typical 20 N, 25 N (2.55 kgf) Max. EIA-364-13</li> </ul>	<ul style="list-style-type: none"> <li>No evidence of physical damage</li> </ul>	
Durability (precondition)	<ul style="list-style-type: none"> <li>EIA-364-09</li> <li>Perform 5 unplug /plug cycles if the application requires up to 25 over the life of the connector , 20 cycles if the application requires 26-200;</li> </ul>	<ul style="list-style-type: none"> <li>No evidence of physical damage</li> </ul>	
Durability	<ul style="list-style-type: none"> <li>Option1 :Repeat insertion the Card to the connector and extraction Card from the connector for 25 cycles(Au:30u"Max).</li> <li>Option2:Repeat insertion the Card to the connector and extraction Card from the connector for 60 cycles(Au:30u"Min).</li> <li>EIA-364-09</li> </ul>	<ul style="list-style-type: none"> <li><math>\Delta</math>LLCR=20m<math>\Omega</math> Max.(Final)</li> </ul>	
Reseating	<ul style="list-style-type: none"> <li>Manually unplug/plug the connector or socket perform 3 cycles</li> </ul>	<ul style="list-style-type: none"> <li>No evidence of physical damage</li> </ul>	
<b>LOTES CO., LTD</b>		<b>TITLE:</b>	
		<b>M.2 CONNECTOR</b>	
		<b>DOCUMENT No:</b> SP-APCI0018	<b>REV:</b> 1C
		<b>PAGE:</b> 2 OF 5	
		<b>APPROVED BY:</b> Barney	<b>CHECKED BY:</b> Vito
		<b>WRITTEN BY:</b> TAN ZHI WU	

PRODUCT SPECIFICATION		REV	ECN No.
		1C	SN14***
ENVIRONMENTAL PERFORMANCE			
Test item	Test condition	Requirements	
Cyclic temperature & Humidity	<ul style="list-style-type: none"> <li>EIA-364-31 method III without conditioning, initial measurements, cold shock and vibration. (Except cycle the connector or socket between 25°C±3°C at 80% ± 3% RH and 65°C±3°C at 50% ± 3% RH . Ramp times should be 0.5 hour and dwell times should be 1.0 hour. Dwell times start when the temperature and humidity have stabilized within the specified levels. Perform 24 such cycles.)</li> <li>EIA-364-31</li> </ul>	<ul style="list-style-type: none"> <li>Contact resistance: ΔLLCR=20mΩ Max.</li> <li>Insulation resistance:500MΩ Min.</li> <li>No physical damage.</li> </ul>	
Thermal shock	<ul style="list-style-type: none"> <li>EIA-364-32,method A,test condition I,test duration A-4</li> <li>Cold extreme :-55°C+0/-5°C</li> <li>Hot extreme :85°C+3/-0°C</li> <li>each temperature dwell 2 hour, perform 10 cycles in mated condition.</li> </ul>	<ul style="list-style-type: none"> <li>Contact resistance: ΔLLCR=20mΩ Max.(Final)</li> <li>No physical damage.</li> </ul>	
Salt spray	<ul style="list-style-type: none"> <li>Subject the connector to 5% salt-solution concentration at 35°C for 48 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Contact resistance: ΔLLCR=20mΩ Max .(Final)</li> <li>No physical damage.</li> </ul>	
Temperature life	<ul style="list-style-type: none"> <li>Mate PCB module and subject to 105±2°C for 120 hours EIA-364-17</li> </ul>	<ul style="list-style-type: none"> <li>Contact resistance: ΔLLCR=20mΩ Max.(Final)</li> <li>No physical damage.</li> </ul>	
Temperature life (preconditioning)	<ul style="list-style-type: none"> <li>Mate PCB module and subject to 105±2°C for 72 hours EIA 364-17 method A, using table 9 for reference</li> </ul>	<ul style="list-style-type: none"> <li>Contact resistance: ΔLLCR=20mΩ Max.(Final)</li> <li>No physical damage.</li> </ul>	
Resistance to Reflow Soldering Heat	<ul style="list-style-type: none"> <li>Test connector on PCB</li> <li>Pre-Heat :100~150°C</li> <li>Heat : 210°C</li> <li>Heat Peak : 260+/-5°C ,10+/-1s</li> </ul>	<ul style="list-style-type: none"> <li>No physical damage</li> </ul>	
Solder ability	<ul style="list-style-type: none"> <li>Solder Temperature :245±5°C</li> <li>Solder time : 3±0.5s</li> </ul>	<ul style="list-style-type: none"> <li>Wet solder coverage: 95% Min.</li> </ul>	
Rework temperature	<ul style="list-style-type: none"> <li>350°C,3-5seconds for “solder iron-Max.”, temperature of component by rework process.</li> </ul>	<ul style="list-style-type: none"> <li>No Damage</li> </ul>	
Mixed flowing gas	<ul style="list-style-type: none"> <li>EIA-364-65, Environmental Class – IIA</li> <li>For 7days, Connectors should be mated during this portion of the test. Total Mixed flowing gas exposure 168 hours , include unmated exposure 112 hours and mated exposure 56 hours.</li> </ul>	<ul style="list-style-type: none"> <li>No discontinuations of microsecond or longer duration</li> <li>Contact resistance: ΔLLCR=20mΩ Max. (Final )</li> </ul>	
Thermal disturbance	<ul style="list-style-type: none"> <li>Cycle the mated connector between 15°C±3°C and 85°C±3°C, as measured on the part. Ramps should be a minimum of 2°C per minute, and dwell times should insure that the contacts reach the temperature extremes(a minimum of 5 minutes). Humidity is not controlled. Perform 10 such cycles.</li> </ul>	<ul style="list-style-type: none"> <li>No evidence of physical damage</li> <li>Contact resistance: ΔLLCR=20mΩ Max. (Final )</li> </ul>	
<b>LOTES CO., LTD</b>		<b>TITLE:</b>	
		<b>M.2 CONNECTOR</b>	
		<b>DOCUMENT No:</b> SP-APCI0018	<b>REV:</b> 1C
		<b>APPROVED BY:</b> Barney	<b>WRITTEN BY:</b> TAN ZHI WU
		<b>CHECKED BY:</b> Vito	

PRODUCT SPECIFICATION	REV	ECN No.
	1C	SN14***

## LOTES RECOMMENDED LEAD FREE SMT TEMPERATURE PROFILE

Suggestion : In SMT process , the thickness of solder paste is 0.13mm minimum



### PACKAGE

All parts shall be packaged and packed to protect against physical damage, corrosion and deterioration during shipment and storage.

LOTES CO., LTD	PRODUCT NAME: M.2 CONNECTOR		
	DOCUMENT No: SP-APCI0018	REV: 1C	PAGE: 4 OF 5
	APPROVED BY: Barney	CHECKED BY: Vito	WRITTEN BY: TAN ZHI WU

PRODUCT SPECIFICATION				REV	ECN No.																																																																																																																																											
				1C	SN14***																																																																																																																																											
<b>Test conditions</b> The tests shall be carried out under the conditions as the referring.0 (1).Temperature:15~35℃. (2).Humidity: 45~75%																																																																																																																																																
<b>Test Sequence:</b> <table border="1"> <thead> <tr> <th rowspan="2">Test or Examination</th> <th colspan="6">Test Group</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>Examination of Product</td> <td>1,8</td> <td>1,10</td> <td>1,10</td> <td>1,10</td> <td>1,4</td> <td>1</td> </tr> <tr> <td>Low Level Contact Resistance</td> <td>2,5,7</td> <td>2,5,7,9</td> <td>2,5,7,9</td> <td>2,6,9</td> <td></td> <td></td> </tr> <tr> <td>Dielectric Withstanding Voltage</td> <td></td> <td></td> <td></td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>Insulation Resistance</td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td></td> </tr> <tr> <td>Temperature versus current</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>Vibration</td> <td></td> <td></td> <td>6</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Mechanical shock</td> <td></td> <td></td> <td>8</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Insertion/Removal Force</td> <td></td> <td></td> <td></td> <td>3,5,8</td> <td></td> <td></td> </tr> <tr> <td>Durability (precondition)</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Durability</td> <td></td> <td></td> <td></td> <td>4,7</td> <td></td> <td></td> </tr> <tr> <td>Thermal Shock</td> <td></td> <td>4</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Cyclic temperature(Humidity)</td> <td></td> <td>6</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Mixed flowing gas</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Reseating</td> <td>6</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Thermal disturbance</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Temperature life</td> <td>4</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Temperature life (Preconditioning)</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Specimen quantity (pcs)</td> <td>5</td> <td>5</td> <td>5</td> <td>5</td> <td>5</td> <td>5</td> </tr> </tbody> </table>						Test or Examination	Test Group						A	B	C	D	E	F	Examination of Product	1,8	1,10	1,10	1,10	1,4	1	Low Level Contact Resistance	2,5,7	2,5,7,9	2,5,7,9	2,6,9			Dielectric Withstanding Voltage					2		Insulation Resistance					3		Temperature versus current						2	Vibration			6				Mechanical shock			8				Insertion/Removal Force				3,5,8			Durability (precondition)	3	3	3				Durability				4,7			Thermal Shock		4					Cyclic temperature(Humidity)		6					Mixed flowing gas							Reseating	6	8					Thermal disturbance							Temperature life	4						Temperature life (Preconditioning)			4				Specimen quantity (pcs)	5	5	5	5	5	5
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F

E

D

C

B

A

F

E

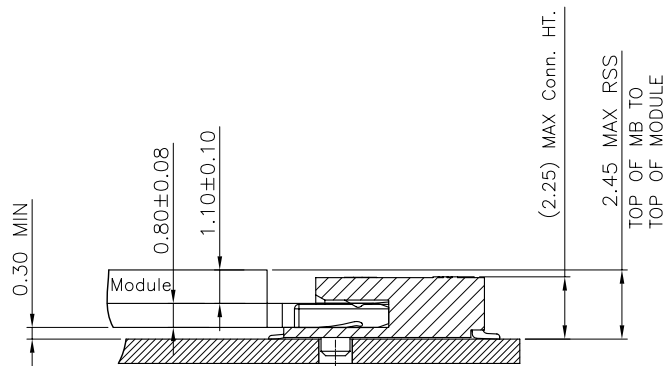
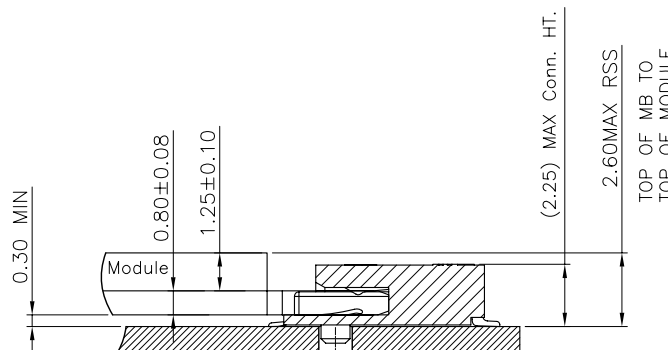
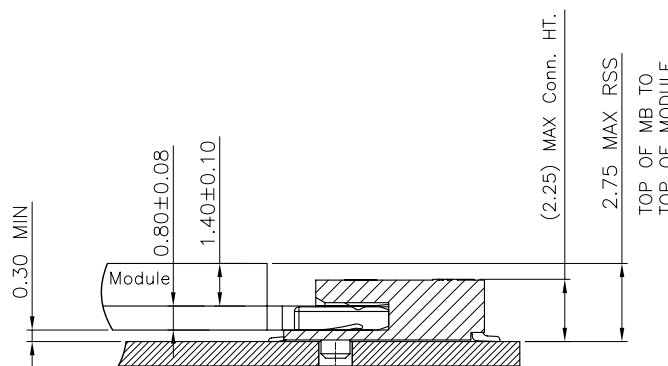
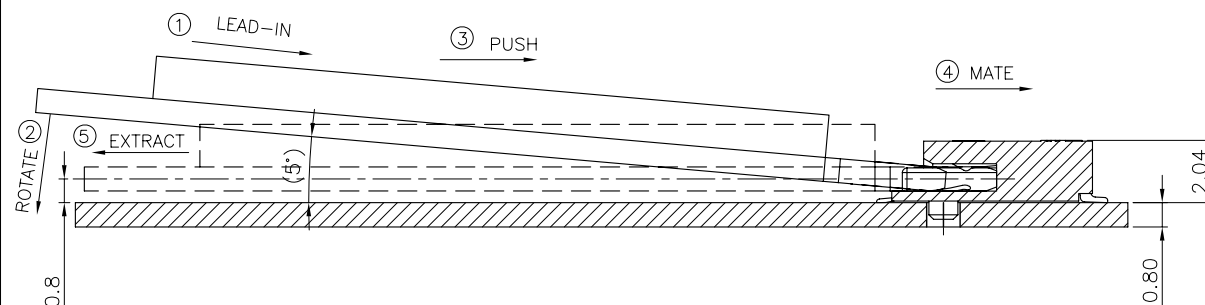
D

C

B

A

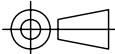
----- Assembly stack height schematic diagram -----

Stack-up Top Mount Single Sided Module  
for 1.20 max top-side component heightStack-up Top Mount Single Sided Module  
for 1.35 max top-side component heightStack-up Top Mount Single Sided Module  
for 1.5 max top-side component heightHOW TO MATE AND EXTRACT  
-----

MATE: ① → ④

EXTRACT: ⑤

NOTE: Mating force will generate from step 3 to step 4.

GENERAL TOLERANCES UNLESS SPECIFIED		PART NO.  SEE TABLE	<b>LOTES</b>			
.X ± 0.35	X.° ± 3°					
.XX ± 0.25	X.° ± 2°	APPROVED BY  Barney	TITLE  0.5 PITCH M.2 H2.3 (M key)			
.XXX ± 0.15	.XX° ± 1°	CHECKED BY  Vito	DWG NO.  AP-APCI0146-P			
CUSTOMER DRAWING						
SIZE	UNITS	DRAWN BY  Jason		SHEET	SCALE	REV
A4	MM [INCH]			2 / 4	4 : 1	A

1

2

3

4

5

6

7

8

1

2

3

4

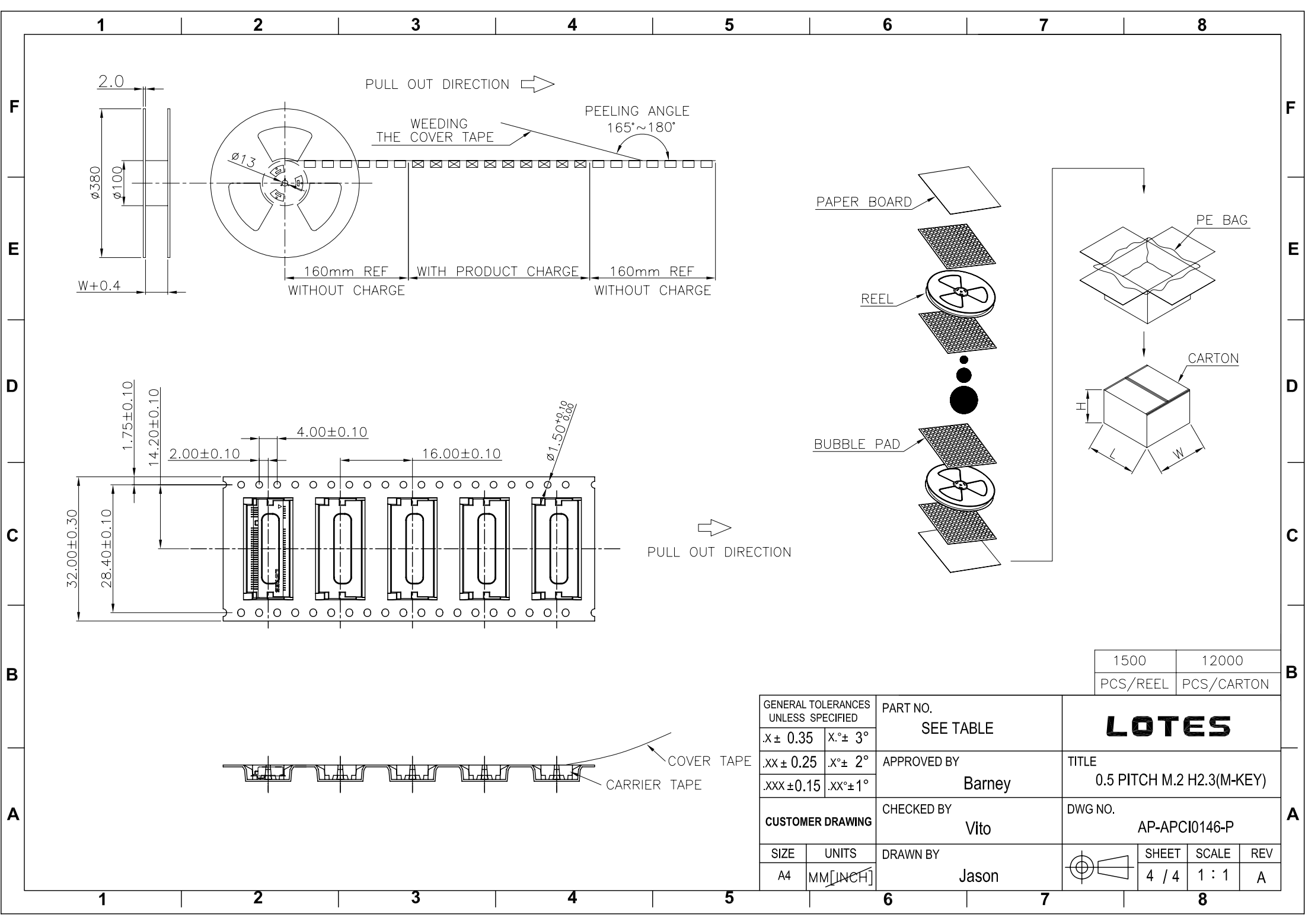
5

6

7

8





1500	12000
PCS/REEL	PCS/CARTON

GENERAL TOLERANCES UNLESS SPECIFIED		PART NO. SEE TABLE	<b>LOTES</b>			
.X $\pm$ 0.35	X. $^{\circ}$ $\pm$ 3 $^{\circ}$		TITLE 0.5 PITCH M.2 H2.3(M-KEY)			
.XX $\pm$ 0.25	X. $^{\circ}$ $\pm$ 2 $^{\circ}$		DWG NO. AP-APCI0146-P			
.XXX $\pm$ 0.15	.XX $^{\circ}$ $\pm$ 1 $^{\circ}$	APPROVED BY Barney				
CUSTOMER DRAWING		CHECKED BY Vito				
SIZE A4	UNITS MM [INCH]	DRAWN BY Jason				
				SHEET 4 / 4	SCALE 1 : 1	REV A

# PRODUCT RELIABILITY TEST REPORT

ReportNo:GL-SZ20130315-01

product:0.5Pitch M.2 H2.3 M key

Part NO:APCI0146-P00\*

Test Object:Product Reliability Test

Sample Quantity:35PCS

Test Environment:20℃ 52%RH

Date of Test:2013-03-18~2013-03-29

Prepared By:周用双

Checked By:苏士坤

Approved By:周志奇

## Test Result Summary:

Qualification Group	Pass / Fail	Comments
groupA	Qualified	
groupB	Qualified	
groupC	Qualified	
groupD	Qualified	
groupE	Qualified	
groupF	Qualified	
groupG	Qualified	

# PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

**1. Testing Sequence:**

Test or Examination	Test Group						
	1	2	3	4	5	6	7
Examination of Product	1,8	1,10	1,8	1,10	1,7	1,4	1
Low Level Contact Resistance	2,5,7	2,5,7,9	2,5,7	2,6,9	2,4,6		
Dielectric Withstanding Voltage						2	
Insulation Resistance						3	
Temperature Versus Current							2
Vibration			6				
Mechanical shock					5		
Insertion/Removal Force				3,5,8			
Durability (Precondition)	3	3	3		3		
Durability				4,7			
Thermal Shock		4					
Cyclic Temperature(Humidity)		6					
Reseating	6	8					
Thermal Disturbance							
Temperature Life	4						
Temperature Life (Preconditioning)			4				
Specimen Quantity (pcs)	5	5	5	5	5	5	5

## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

### 2. Test Item & Condition & Requirements :

	Test item	Test condition	Requirements
1	Examination of product	Visual inspection	No physical damage
2	Low Level Contact Resistance	EIA-364-23 Mate connectors: apply a current of 10mA(Max) at open circuit voltage of 20mVvoltage(Max)	Initial 55mΩ Max Final $\Delta$ LLCR =20mΩ Max
3	Insulation Resistance	EIA-364-21 Applying 500VDC for one minute between adjacent contacts of unmated connectors	500MΩ Min
4	Dielectric Withstanding Voltage	EIA-364-20 Measured by applying 300VAC for one minute between adjacent contacts of unmated connector assemblies.	No breakdown or flash Current leakage: 0.5 Ma
5	Temperature Versus Current	EIA-364-70 Method 2 The temperature rise above ambient shall not exceed 30°C .the ambient condition is still air at 25°C .	No physical damage $\Delta$ T=30°C Max
6	Vibration	EIA-364-28 Test condition VII, test condition letter D( 15 minutes in each of 3 mutually perpendicular directions . Both mating halves should be rigidly fixed so as not to contribute to the relative motion of one contact against another . The method of fixturing should be detailed in the test report)	No electrical discontinuity greater than 1 microsecond. $\Delta$ LLCR=20mΩ Max.(Final)
7	Mechanical Shock	250 G (Ultra-book) and 285 G (Tablet) at 2m Sec half sine on all six axis	No electrical discontinuity greater than 1 microsecond, $\Delta$ LLCR=20mΩ Max.(Final) No physical damage
8	Insertion/Removal Force	EIA-364-13 Insertion Force-20 N (2.04 kgf) max Removal Force-Typical 20 N, 25 N (2.55 kgf) max	No evidence of physical damage
9	Durability (Precondition)	EIA-364-09 Perform 5 unplug /plug cycles if the application requires up to 25 over the life of the connector ,20 cycles if the application requires 26-200	No evidence of physical damage

## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

	Test item	Test condition	Requirements
10	Durability	EIA-364-09 Option1:Repeat insertion the Card to the connector and extraction Card from the connector for 25cycles(Au:30u'max). Option2:Repeat insertion the Card to the connector and extraction Card from the connector for 60 cycles(Au:30u'min).	$\Delta$ LLCR=20m $\Omega$ Max.(Final)
11	Reseating	Manually unplug/plug the connector or socket perform 3 cycles	No evidence of physical damage
12	Cyclic Temperature & Humidity	EIA-364-31 method III without conditioning,initial measurements,cold shock and vibration.(Except cycle the connector or socket between 25°C $\pm$ 3°C at 80% $\pm$ 3% RH and 65°C $\pm$ 3°C at 50% $\pm$ 3% RH . Ramp times should be 0.5 hour and dwell times should be 1.0 hour . Dwell times start when the temperature and humidity have stabilized within the specified levels.Perform 24 such cycles.)	Contact resistance: $\Delta$ LLCR=20m $\Omega$ Max. Insulation resistance:500M $\Omega$ Min. No physical damage.
13	Thermal Shock	EIA-364-32 method A,test condition I,test duration A-4 Cold extreme :-55°C+0/-5°C,Hot extreme :85°C+3/-0°C.Each temperature dwell 2 hour, perform 10 cycles in mated condition.	Contact resistance: $\Delta$ LLCR=20m $\Omega$ Max. No physical damage.
14	Salt Spray	Subject the connector to 5% salt-solution concentration at 35°C for 48 hours.	Contact resistance: $\Delta$ LLCR=20m $\Omega$ Max . No physical damage.
15	Temperature Life	EIA-364-17 Mate PCB module and subject to 105 $\pm$ 2°C for 120hours	Contact resistance: $\Delta$ LLCR=20m $\Omega$ Max. No physical damage
16	Temperature Life (Preconditioning)	EIA 364-17 Mate PCB module and subject to 105 $\pm$ 2°C for 72hours method A,using table 9 for reference	Contact resistance: $\Delta$ LLCR=20m $\Omega$ Max.(Final) No physical damage
17	Resistance to Reflow Soldering Heat	Test connector on PCB • Pre-Heat :100~150°C Heat : 210°C Heat Peak : 260+/-5°C,10+/-1s	No physical damage
18	Solder Ability	Solder Temperature :245 $\pm$ 5°C Solder time : 3 $\pm$ 0.5s	Wet solder coverage: 95%Min

## PRODUCT RELIABILITY TEST REPORT

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	Test item	Test condition	Requirements
19	Rework Temperature	350°C,3-5seconds for “solder iron-Max”,temperature of component by rework process.	No Damage
21	Thermal Disturbance	Cycle the mated connector between 15°C±3°C and 85°C±3°C, as measured on the part. Ramps should be a minimum of 2°C per minute, and dwell times should insure that the contacts reach the temperature extremes(a minimum of 5 minutes). Humidity is not controlled. Perform 10 such cycles.	No evidence of physical damage Contact resistance:△LLCR=20mΩ max. (Final )



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

### 3. Testing Result:

#### Group A:

Examination step/ item		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Unit	Pass/fail
1	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass
2	LLCR	35.72	36.25	31.19	33.63	31.20	mΩ	Pass
3	Durability(Precondition)	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Temperature life	Normal	Normal	Normal	Normal	Normal	/	Pass
5	LLCR	38.18	35.38	34.61	39.45	37.06	mΩ	Pass
	ΔLLCR	9.94	5.86	5.67	8.61	8.85	mΩ	Pass
6	Reseating	Normal	Normal	Normal	Normal	Normal	/	Pass
7	LLCR	35.69	34.38	32.41	35.43	34.72	mΩ	Pass
	ΔLLCR	8.60	7.18	5.69	6.84	8.61	mΩ	Pass
8	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass

#### Group B:

Examination step/ item		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Unit	Pass/fail
1	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass
2	LLCR	35.44	38.95	30.91	33.34	30.92	mΩ	Pass
3	Durability(Precondition)	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Thermal Shock	Normal	Normal	Normal	Normal	Normal	/	Pass
5	LLCR	38.47	34.37	36.34	39.75	37.35	mΩ	Pass
	ΔLLCR	10.52	8.90	8.51	9.19	9.43	mΩ	Pass
6	Cyclic Temperature & Humidity	Normal	Normal	Normal	Normal	Normal	/	Pass
7	LLCR	35.65	36.95	33.72	35.94	35.23	mΩ	Pass
	ΔLLCR	9.39	9.34	8.21	7.63	10.95	mΩ	Pass
8	Reseating	Normal	Normal	Normal	Normal	Normal	/	Pass
9	LLCR	35.36	36.42	33.19	35.80	35.10	mΩ	Pass
	ΔLLCR	9.25	9.48	7.68	7.50	10.42	mΩ	Pass
10	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass

# PRODUCT RELIABILITY TEST REPORT

**Report No. GL-SZ20130315-01**
**GL-P-027-005**
**Group C**

Examination step/ item		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Unit	Pass/fail
1	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass
2	LLCR	35.26	33.01	33.84	31.91	31.77	mΩ	Pass
3	Durability(Precondition)	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Temperature life (preconditioning)	Normal	Normal	Normal	Normal	Normal	/	Pass
5	LLCR	36.03	33.88	34.81	34.56	34.30	mΩ	Pass
	ΔLLCR	4.74	7.64	5.92	4.28	4.55	mΩ	Pass
6	Vibration	Normal	Normal	Normal	Normal	Normal	/	Pass
7	LLCR	36.48	36.43	35.08	38.64	35.23	mΩ	Pass
	ΔLLCR	3.51	8.04	5.69	8.07	5.04	mΩ	Pass
8	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass

**Group D:**

Examination step/ item		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Unit	Pass/fail
1	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass
2	LLCR	33.21	33.22	36.20	31.24	30.28	mΩ	Pass
3	Insertion force	1.42	1.43	1.40	1.38	1.31	kgf	Pass
	Removal Force	0.48	0.53	0.55	0.54	0.49	kgf	Pass
4	Durability	Normal	Normal	Normal	Normal	Normal	/	Pass
5	Insertion force	1.33	1.39	1.36	1.40	1.43	kgf	Pass
	Removal Force	0.51	0.50	0.46	0.51	0.52	kgf	Pass
6	LLCR	32.45	31.81	38.24	31.85	32.55	mΩ	Pass
	ΔLLCR	2.36	4.14	2.69	1.35	2.48	mΩ	Pass
7	Durability	Normal	Normal	Normal	Normal	Normal	/	Pass
8	Insertion force	1.23	1.28	1.23	1.29	1.30	kgf	Pass
	Removal Force	0.58	0.49	0.42	0.52	0.56	kgf	Pass
9	LLCR	32.71	32.15	37.39	31.04	31.52	mΩ	Pass
	ΔLLCR	4.67	4.26	2.92	3.25	2.68	mΩ	Pass
10	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass

# PRODUCT RELIABILITY TEST REPORT

**Report No. GL-SZ20130315-01****GL-P-027-005****Group E:**

Examination step/ item		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Unit	Pass/fail
1	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass
2	LLCR	38.42	31.80	33.98	32.75	31.99	mΩ	Pass
3	Durability(Precondition)	Normal	Normal	Normal	Normal	Normal	/	Pass
4	LLCR	49.75	31.21	34.81	34.63	33.62	mΩ	Pass
	ΔLLCR	11.33	1.58	3.27	4.23	3.34	mΩ	Pass
5	Mechanical Shock	Normal	Normal	Normal	Normal	Normal	/	Pass
6	LLCR	41.13	31.99	38.57	32.69	32.89	mΩ	Pass
	ΔLLCR	4.62	3.14	6.47	3.78	3.20	mΩ	Pass
7	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass

**Group F:**

Examination step/ item		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Unit	Pass/fail
1	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass
2	Dielectric Withstanding Voltage	Normal	Normal	Normal	Normal	Normal	/	Pass
3	Insulation Resistance	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass

**Group G:**

Examination step/ item		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Unit	Pass/fail
1	Examination of Product	Normal	Normal	Normal	Normal	Normal	/	Pass
2	Temperature Versus Current	Normal	Normal	Normal	Normal	Normal	/	Pass

## PRODUCT RELIABILITY TEST REPORT

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#### 4. The LLCR as follow(Unit :m $\Omega$ ):

##### Group A:

No.	Initial				
	1-1	1-2	1-3	1-4	1-5
1	28.81	27.02	24.13	28.59	23.43
2	33.85	34.02	25.00	29.64	31.20
3	31.10	30.14	31.19	28.12	26.60
4	29.53	33.56	29.13	28.72	27.24
5	31.97	31.74	24.54	29.85	28.59
6	27.28	28.67	26.45	30.61	28.59
7	26.43	29.53	27.46	29.64	27.40
8	26.59	28.79	26.60	28.72	25.73
9	25.56	28.18	26.48	29.87	25.36
10	35.72	34.17	26.90	33.63	28.13
11	27.62	31.05	29.70	30.70	25.26
12	26.37	28.92	25.81	27.72	27.03
13	26.39	32.42	26.54	30.20	26.19
14	30.63	36.25	27.83	30.82	28.02
15	26.80	30.86	28.95	30.84	27.91
16	27.10	31.06	26.82	29.65	27.37
17	29.32	28.25	27.69	29.36	29.47
18	30.02	31.76	30.56	29.84	24.67
Max	35.72	36.25	31.19	33.63	31.20
Min	25.56	27.02	24.13	27.72	23.43
Aver	28.95	30.91	27.32	29.80	27.12

# PRODUCT RELIABILITY TEST REPORT

**Report No. GL-SZ20130315-01****GL-P-027-005**

No.	After Temperature					$\Delta$ LLCR(After Temperature)				
	1-1	1-2	1-3	1-4	1-5	1-1	1-2	1-3	1-4	1-5
1	29.76	28.18	26.78	33.28	26.09	0.95	1.16	2.65	4.69	2.66
2	31.89	28.80	26.75	31.75	37.06	1.97	5.22	1.75	2.12	5.85
3	32.44	31.13	30.38	31.10	31.64	1.34	1.00	0.81	2.98	5.04
4	32.12	30.70	32.68	36.92	32.09	2.59	2.86	3.55	8.20	4.85
5	32.72	29.76	30.21	35.63	31.27	0.75	1.98	5.67	5.78	2.69
6	34.08	30.93	32.07	36.80	31.85	6.80	2.27	5.62	6.20	3.26
7	34.68	30.24	29.75	34.06	34.92	8.25	0.71	2.29	4.42	7.53
8	33.86	31.28	28.21	34.09	33.72	7.27	2.49	1.61	5.37	7.99
9	27.22	27.38	30.91	33.85	30.11	1.66	0.81	4.44	3.98	4.75
10	38.18	30.63	28.62	34.63	34.94	2.46	3.54	1.72	1.01	6.81
11	28.83	31.79	31.50	33.05	31.23	1.22	0.73	1.80	2.35	5.97
12	32.31	28.79	29.95	32.45	30.28	5.93	0.13	4.14	4.73	3.25
13	34.84	31.75	31.27	37.45	32.75	8.46	0.67	4.73	7.25	6.56
14	32.87	30.39	31.32	36.01	36.86	2.24	5.86	3.49	5.19	8.85
15	36.74	29.51	32.61	39.45	31.72	9.94	1.36	3.66	8.61	3.81
16	36.68	31.95	30.74	36.22	34.84	9.58	0.88	3.92	6.57	7.47
17	32.33	30.15	33.31	33.86	32.81	3.01	1.90	5.63	4.51	3.34
18	34.82	35.38	34.61	34.81	32.80	4.81	3.62	4.05	4.97	8.13
Max	38.18	35.38	34.61	39.45	37.06	9.94	5.86	5.67	8.61	8.85
Min	27.22	27.38	26.75	31.10	26.09	0.75	0.13	0.81	1.01	2.66
Aver	33.13	30.48	30.65	34.74	32.61	4.40	2.07	3.42	4.94	5.49



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

No.	After Reaseating					$\Delta$ LLCR(After Reaseating)				
	1-1	1-2	1-3	1-4	1-5	1-1	1-2	1-3	1-4	1-5
1	32.44	27.27	29.82	35.43	29.24	3.63	0.25	5.69	6.84	5.81
2	29.27	26.84	25.18	32.57	29.44	4.59	7.18	0.18	2.93	1.76
3	27.53	26.66	29.72	27.50	29.59	3.57	3.47	1.47	0.62	2.99
4	29.50	29.93	29.28	30.87	27.48	0.04	3.63	0.15	2.15	0.25
5	30.14	29.10	29.33	32.41	29.38	1.83	2.63	4.79	2.56	0.80
6	34.28	30.28	29.13	31.58	31.43	7.00	1.61	2.68	0.97	2.84
7	34.27	31.28	31.77	32.94	33.62	7.83	1.75	4.31	3.31	6.22
8	33.82	30.35	29.03	33.47	28.53	7.23	1.56	2.43	4.75	2.79
9	27.69	28.79	31.31	34.07	27.76	2.14	0.60	4.83	4.20	2.41
10	31.14	32.29	29.68	31.39	28.61	4.58	1.88	2.78	2.24	0.48
11	31.59	30.57	29.46	30.27	29.65	3.97	0.48	0.24	0.43	4.39
12	32.52	30.64	29.71	31.17	30.10	6.15	1.72	3.89	3.45	3.07
13	34.98	34.38	32.03	32.24	29.47	8.60	1.96	5.50	2.04	3.28
14	31.42	32.63	29.01	31.47	30.80	0.79	3.62	1.18	0.66	2.78
15	32.80	32.36	32.18	32.19	30.51	5.99	1.50	3.23	1.35	2.60
16	34.62	32.91	31.25	31.36	34.72	7.52	1.85	4.43	1.72	7.35
17	30.78	32.00	31.43	30.74	30.19	1.46	3.75	3.75	1.38	0.72
18	35.69	32.69	32.41	32.63	33.28	5.68	0.93	1.85	2.78	8.61
Max	35.69	34.38	32.41	35.43	34.72	8.60	7.18	5.69	6.84	8.61
Min	27.53	26.66	25.18	27.50	27.48	0.04	0.25	0.15	0.43	0.25
Aver	31.92	30.61	30.10	31.90	30.21	4.59	2.24	2.96	2.47	3.29



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

### Group B:

No.	Initial				
	2-1	2-2	2-3	2-4	2-5
1	27.02	26.49	23.85	28.30	23.15
2	33.57	33.74	24.72	29.35	30.92
3	30.82	29.85	30.91	27.84	26.32
4	29.25	33.28	28.85	28.44	26.96
5	31.69	38.95	24.26	29.56	28.30
6	27.00	28.38	26.17	30.33	28.30
7	26.15	29.25	27.18	29.35	27.11
8	26.31	28.51	26.32	28.44	25.45
9	25.28	27.90	26.20	29.59	25.08
10	35.44	33.89	26.62	33.34	27.85
11	27.33	30.77	29.42	30.41	24.98
12	26.09	28.64	25.53	27.44	26.75
13	26.10	32.14	26.26	29.91	25.91
14	30.35	35.97	27.54	30.54	27.73
15	26.52	30.58	28.67	30.56	27.63
16	26.81	30.78	26.54	29.36	27.09
17	30.16	28.86	28.25	26.97	28.20
18	28.07	30.55	25.51	28.26	22.27
Max	35.44	38.95	30.91	33.34	30.92
Min	25.28	26.49	23.85	26.97	22.27
Aver	28.55	31.03	26.82	29.33	26.67



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

No.	After Thermal Shock					$\Delta$ LLCR(After Thermal Shock)				
	2-1	2-2	2-3	2-4	2-5	2-1	2-2	2-3	2-4	2-5
1	30.05	28.48	27.08	33.57	26.39	3.03	1.99	3.23	5.27	3.24
2	32.18	29.09	27.04	32.05	37.35	1.39	4.65	2.33	2.70	6.43
3	32.73	31.43	30.68	31.39	31.94	1.92	1.58	0.24	3.55	5.62
4	32.42	31.00	32.98	37.21	32.38	3.17	2.28	4.13	8.78	5.43
5	33.02	30.05	30.51	35.93	31.57	1.33	8.90	6.25	6.36	3.26
6	34.38	31.23	32.36	37.10	32.15	7.38	2.84	6.20	6.77	3.84
7	34.98	30.54	30.05	34.35	35.22	8.83	1.29	2.87	5.00	8.10
8	34.16	31.58	28.51	34.39	34.02	7.85	3.07	2.19	5.95	8.57
9	27.52	27.67	31.21	34.15	30.40	2.24	0.23	5.01	4.56	5.33
10	38.47	30.92	28.92	34.93	35.23	3.04	2.97	2.30	1.58	7.39
11	29.13	32.08	31.80	33.34	31.52	1.79	1.31	2.38	2.93	6.55
12	32.60	29.08	30.25	32.74	30.57	6.51	0.45	4.72	5.30	3.82
13	35.14	32.04	31.57	37.75	33.05	9.03	0.10	5.31	7.83	7.14
14	33.17	30.68	31.61	36.30	37.16	2.82	5.29	4.07	5.77	9.43
15	37.04	29.80	32.91	39.75	32.01	10.52	0.78	4.24	9.19	4.38
16	36.98	32.24	31.03	36.51	35.14	10.16	1.46	4.50	7.15	8.05
17	33.63	32.70	36.34	34.22	32.70	3.47	3.84	8.09	7.25	4.51
18	36.29	34.37	34.02	35.75	31.24	8.22	3.82	8.51	7.49	8.97
Max	38.47	34.37	36.34	39.75	37.35	10.52	8.90	8.51	9.19	9.43
Min	27.52	27.67	27.04	31.39	26.39	1.33	0.10	0.24	1.58	3.24
Aver	33.55	30.83	31.05	35.08	32.78	5.15	2.60	4.25	5.75	6.11



## PRODUCT RELIABILITY TEST REPORT

**Report No. GL-SZ20130315-01****GL-P-027-005**

No.	After Cyclic temperature					$\Delta$ LLCR(After Cyclic temperature)				
	2-1	2-2	2-3	2-4	2-5	2-1	2-2	2-3	2-4	2-5
1	32.94	27.77	30.33	35.94	29.75	5.92	1.29	6.48	7.63	6.60
2	29.78	27.34	25.69	33.08	29.95	3.80	6.39	0.97	3.72	0.97
3	28.04	27.17	30.23	28.01	30.10	2.78	2.68	0.68	0.17	3.78
4	30.00	30.44	29.79	31.38	27.99	0.75	2.84	0.94	2.94	1.04
5	30.65	29.61	29.84	32.92	29.89	1.04	9.34	5.58	3.35	1.59
6	34.79	30.78	29.64	32.09	31.94	7.79	2.40	3.47	1.76	3.63
7	34.77	31.79	32.28	33.45	34.13	8.62	2.54	5.10	4.10	7.01
8	34.33	30.85	29.54	33.98	29.03	8.02	2.35	3.22	5.54	3.58
9	28.20	29.30	31.82	34.58	28.27	2.93	1.39	5.62	4.99	3.20
10	31.65	32.80	30.19	31.89	29.12	3.79	1.09	3.57	1.45	1.27
11	32.10	31.08	29.97	30.77	30.16	4.76	0.31	0.55	0.36	5.18
12	33.03	31.15	30.21	31.68	30.61	6.94	2.51	4.68	4.24	3.86
13	35.49	34.89	32.54	32.74	29.98	9.39	2.75	6.29	2.83	4.07
14	31.93	33.14	29.51	31.98	31.31	1.58	2.83	1.97	1.45	3.57
15	33.30	32.87	32.69	32.70	31.02	6.78	2.29	4.02	2.14	3.39
16	35.12	33.42	31.75	31.87	35.23	8.31	2.64	5.22	2.51	8.14
17	32.10	33.04	32.50	32.38	30.86	1.95	4.18	4.25	5.40	2.67
18	35.65	36.95	33.72	33.54	33.22	7.57	6.40	8.21	5.28	10.95
Max	35.65	36.95	33.72	35.94	35.23	9.39	9.34	8.21	7.63	10.95
Min	28.04	27.17	25.69	28.01	27.99	0.75	0.31	0.55	0.17	0.97
Aver	32.44	31.35	30.68	32.50	30.70	5.15	3.12	3.93	3.33	4.14



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

No.	After Reaseating					$\Delta$ LLCR(After Reaseating)				
	2-1	2-2	2-3	2-4	2-5	2-1	2-2	2-3	2-4	2-5
1	32.81	27.64	30.20	35.80	29.62	5.79	1.15	6.35	7.50	6.47
2	29.64	27.21	25.56	32.94	29.82	3.93	6.53	0.84	3.59	1.10
3	27.90	27.04	30.10	27.88	29.97	2.91	2.82	0.81	0.04	3.65
4	29.87	30.31	29.65	31.25	27.86	0.62	2.97	0.81	2.81	0.90
5	30.52	29.48	29.71	32.79	29.76	1.17	9.48	5.44	3.22	1.45
6	34.66	30.65	29.50	31.95	31.81	7.66	2.27	3.34	1.63	3.50
7	34.64	31.66	32.15	33.32	33.99	8.49	2.41	4.97	3.97	6.88
8	34.19	30.72	29.41	33.84	28.90	7.89	2.22	3.09	5.41	3.45
9	28.07	29.16	31.68	34.45	28.14	2.79	1.26	5.49	4.86	3.06
10	31.52	32.66	30.06	31.76	28.99	3.92	1.22	3.44	1.58	1.14
11	31.96	30.95	29.84	30.64	30.03	4.63	0.18	0.42	0.23	5.05
12	32.90	31.02	30.08	31.54	30.48	6.81	2.38	4.55	4.11	3.73
13	35.36	34.75	32.41	32.61	29.85	9.25	2.62	6.15	2.70	3.94
14	31.80	33.00	29.38	31.85	31.18	1.45	2.97	1.84	1.31	3.44
15	33.17	32.73	32.56	32.57	30.89	6.65	2.15	3.89	2.01	3.26
16	34.99	33.28	31.62	31.74	35.10	8.18	2.50	5.09	2.37	8.01
17	31.84	32.78	32.23	32.11	30.60	1.68	3.91	3.98	5.14	2.40
18	35.12	36.42	33.19	33.01	32.69	7.04	5.87	7.68	4.75	10.42
Max	35.36	36.42	33.19	35.80	35.10	9.25	9.48	7.68	7.50	10.42
Min	27.90	27.04	25.56	27.88	27.86	0.62	0.18	0.42	0.04	0.90
Aver	32.28	31.19	30.52	32.34	30.54	5.05	3.05	3.79	3.18	3.99



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

Group C:

No.	Initial				
	3-1	3-2	3-3	3-4	3-5
1	28.23	28.17	28.08	29.04	28.26
2	28.17	25.59	31.26	27.80	28.29
3	29.09	25.63	30.41	26.41	27.46
4	28.87	25.91	28.59	26.49	27.41
5	28.66	27.59	28.76	25.68	26.41
6	29.90	28.09	27.34	27.84	26.49
7	29.15	28.59	30.57	26.89	27.14
8	30.84	26.16	33.01	26.11	26.46
9	32.56	29.67	33.84	31.91	30.13
10	29.59	27.59	26.32	31.00	29.41
11	32.59	26.59	28.66	28.13	29.59
12	29.67	27.16	32.34	29.66	27.59
13	31.42	26.29	31.37	28.77	28.98
14	28.82	28.09	32.80	28.51	28.60
15	29.48	28.39	28.01	29.26	29.65
16	34.05	33.01	31.34	31.32	31.77
17	32.68	29.18	32.63	31.26	30.19
18	35.26	30.54	32.71	30.57	28.69
Max	35.26	33.01	33.84	31.91	31.77
Min	28.17	25.59	26.32	25.68	26.41
Aver	30.50	27.90	30.45	28.70	28.47

## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

No.	After Temperature life					$\Delta$ LLCR(After Temperature life)				
	3-1	3-2	3-3	3-4	3-5	3-1	3-2	3-3	3-4	3-5
1	27.77	28.46	28.15	27.88	27.81	0.46	0.30	0.07	1.16	0.44
2	28.42	27.61	30.14	29.02	28.96	0.25	2.01	1.12	1.22	0.67
3	28.82	27.40	28.38	26.98	27.35	0.27	1.77	2.03	0.57	0.11
4	32.33	26.44	28.02	26.18	28.81	3.46	0.52	0.57	0.31	1.40
5	27.15	33.88	29.33	27.19	29.19	1.51	6.29	0.58	1.51	2.78
6	26.49	27.81	29.24	27.09	28.73	3.41	0.27	1.90	0.75	2.24
7	27.16	29.38	27.63	27.10	27.34	2.00	0.79	2.94	0.22	0.20
8	26.65	29.73	27.10	30.39	28.22	4.19	3.57	5.92	4.28	1.76
9	32.76	31.09	28.82	27.98	31.01	0.20	1.42	5.02	3.93	0.88
10	28.97	28.27	30.17	33.77	31.91	0.62	0.68	3.85	2.77	2.50
11	28.82	28.18	28.77	31.40	32.23	3.77	1.60	0.11	3.27	2.64
12	33.95	29.21	27.09	28.41	32.13	4.28	2.04	5.25	1.26	4.55
13	29.54	29.40	32.88	31.48	30.41	1.88	3.11	1.51	2.71	1.43
14	28.53	27.71	30.39	31.13	30.30	0.29	0.38	2.42	2.62	1.70
15	30.31	30.27	32.49	29.63	31.11	0.82	1.88	4.48	0.38	1.46
16	33.13	25.38	34.81	34.56	33.87	0.92	7.64	3.47	3.24	2.10
17	36.03	30.28	32.53	33.50	34.30	3.35	1.10	0.10	2.24	4.11
18	30.52	30.85	32.77	29.68	30.55	4.74	0.31	0.06	0.89	1.86
Max	36.03	33.88	34.81	34.56	34.30	4.74	7.64	5.92	4.28	4.55
Min	26.49	25.38	27.09	26.18	27.34	0.20	0.27	0.06	0.22	0.11
Aver	29.85	28.96	29.93	29.63	30.23	2.02	1.98	2.30	1.85	1.82

## PRODUCT RELIABILITY TEST REPORT

**Report No. GL-SZ20130315-01****GL-P-027-005**

No.	After Vibration					$\Delta$ LLCR(After Vibration)				
	3-1	3-2	3-3	3-4	3-5	3-1	3-2	3-3	3-4	3-5
1	28.15	28.66	28.82	29.56	28.19	0.09	0.49	0.74	0.53	0.06
2	29.06	28.92	29.61	27.09	27.76	0.89	3.33	1.65	0.71	0.54
3	31.35	28.83	28.91	27.11	30.63	2.26	3.21	1.50	0.69	3.18
4	25.59	25.94	29.63	28.19	29.70	3.29	0.03	1.04	1.71	2.28
5	25.16	33.80	32.15	27.76	28.80	3.51	6.21	3.40	2.08	2.39
6	31.42	35.53	28.79	33.01	29.56	1.52	7.44	1.45	5.17	3.07
7	28.49	33.95	28.06	29.70	29.52	0.66	5.36	2.51	2.81	2.38
8	28.84	34.20	28.32	28.80	29.24	2.00	8.04	4.69	2.69	2.78
9	34.14	34.31	30.81	29.56	29.10	1.58	4.65	3.03	2.35	1.03
10	31.30	31.86	32.01	32.01	33.76	1.71	4.27	5.69	1.01	4.36
11	33.96	31.16	33.76	32.16	31.91	1.37	4.57	5.10	4.04	2.32
12	33.13	31.26	32.12	30.70	31.41	3.47	4.10	0.22	1.04	3.82
13	28.09	28.54	29.51	31.55	30.31	3.33	2.25	1.86	2.78	1.33
14	29.12	29.28	29.32	31.90	31.02	0.30	1.19	3.48	3.39	2.43
15	30.94	32.41	30.62	33.76	31.13	1.46	4.02	2.61	4.51	1.48
16	33.65	31.43	34.67	33.81	32.88	0.40	1.59	3.33	2.49	1.12
17	32.82	31.15	35.08	32.69	35.23	0.13	1.97	2.46	1.43	5.04
18	36.48	36.43	29.66	38.64	30.25	1.22	5.89	3.05	8.07	1.56
Max	36.48	36.43	35.08	38.64	35.23	3.51	8.04	5.69	8.07	5.04
Min	25.16	25.94	28.06	27.09	27.76	0.09	0.03	0.22	0.53	0.06
Aver	30.65	31.54	30.66	31.00	30.58	1.62	3.81	2.66	2.64	2.29



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

Group D:

No.	Initial				
	1-1	1-2	1-3	1-4	1-5
1	26.33	26.14	26.55	26.91	26.29
2	27.28	27.50	25.95	27.21	25.44
3	25.72	28.51	29.64	25.88	25.91
4	25.38	27.11	27.24	27.41	26.96
5	25.79	25.20	27.77	26.34	26.29
6	24.73	29.00	27.45	26.41	26.21
7	25.83	27.58	27.05	25.69	28.68
8	27.82	28.11	28.74	27.46	27.46
9	31.53	28.98	29.34	29.92	29.87
10	31.53	32.29	34.09	31.24	29.24
11	33.21	27.97	30.72	30.69	26.99
12	32.71	29.12	31.92	30.42	29.99
13	30.66	24.96	28.38	29.94	26.49
14	29.98	26.55	27.74	31.21	26.15
15	28.48	27.84	30.35	28.99	27.48
16	30.18	28.21	30.73	30.49	29.34
17	29.35	29.92	29.38	29.33	28.63
18	26.58	33.22	36.20	26.95	30.28
Max	33.21	33.22	36.20	31.24	30.28
Min	24.73	24.96	25.95	25.69	25.44
Aver	28.51	28.23	29.40	28.47	27.65

# PRODUCT RELIABILITY TEST REPORT

**Report No. GL-SZ20130315-01****GL-P-027-005**

No.	After Temperature					$\Delta$ LLCR(After Temperature)				
	1-1	1-2	1-3	1-4	1-5	1-1	1-2	1-3	1-4	1-5
1	26.64	25.22	28.11	27.05	26.74	0.31	0.91	1.56	0.13	0.45
2	27.85	27.29	26.41	28.03	25.57	0.57	0.22	0.46	0.82	0.13
3	26.59	27.45	29.54	26.79	25.99	0.87	1.06	0.10	0.91	0.08
4	27.16	27.42	28.59	26.97	25.65	1.77	0.31	1.35	0.44	1.31
5	27.91	26.99	28.41	26.11	25.08	2.12	1.79	0.64	0.23	1.21
6	26.06	29.42	27.39	25.25	25.36	1.33	0.43	0.05	1.15	0.85
7	26.53	28.32	27.11	27.04	27.26	0.71	0.73	0.06	1.35	1.42
8	28.41	27.95	29.10	27.10	26.97	0.59	0.16	0.35	0.36	0.49
9	30.76	30.33	29.96	30.47	28.90	0.77	1.35	0.62	0.55	0.97
10	32.45	31.81	31.40	31.85	29.26	0.91	0.48	2.69	0.61	0.03
11	31.01	28.55	30.40	30.30	28.37	2.20	0.58	0.31	0.39	1.38
12	31.84	30.12	31.29	29.44	30.76	0.87	1.01	0.63	0.99	0.77
13	31.32	27.40	28.71	31.07	26.89	0.66	2.44	0.33	1.13	0.40
14	32.35	27.12	28.42	31.33	28.23	2.36	0.57	0.69	0.12	2.08
15	29.19	28.17	29.62	28.39	29.96	0.72	0.33	0.73	0.61	2.48
16	31.04	30.03	31.74	29.72	29.73	0.86	1.82	1.01	0.77	0.40
17	30.79	30.59	29.94	28.13	29.09	1.44	0.67	0.56	1.20	0.46
18	28.23	29.08	38.24	27.39	32.55	1.65	4.14	2.04	0.44	2.27
Max	32.45	31.81	38.24	31.85	32.55	2.36	4.14	2.69	1.35	2.48
Min	26.06	25.22	26.41	25.25	25.08	0.31	0.16	0.05	0.12	0.03
Aver	29.23	28.51	29.69	28.47	27.91	1.15	1.06	0.79	0.68	0.95



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

No.	After Reaseating					$\Delta$ LLCR(After Reaseating)				
	1-1	1-2	1-3	1-4	1-5	1-1	1-2	1-3	1-4	1-5
1	27.13	26.82	27.41	27.56	27.16	0.80	0.68	0.87	0.65	0.88
2	28.96	27.42	28.04	27.37	27.59	1.68	0.08	2.09	0.15	2.16
3	27.49	28.13	27.41	27.54	25.38	1.77	0.38	2.22	1.66	0.54
4	26.90	27.12	28.09	27.24	26.41	1.51	0.01	0.86	0.18	0.55
5	27.40	28.16	27.46	26.56	27.54	1.61	2.96	0.31	0.22	1.25
6	28.51	28.74	28.08	26.41	27.41	3.79	0.26	0.63	0.00	1.20
7	27.65	30.34	29.96	27.54	26.31	1.83	2.76	2.92	1.86	2.37
8	28.82	27.42	29.14	27.37	27.16	1.00	0.69	0.39	0.09	0.30
9	31.74	31.92	30.09	30.66	28.59	0.21	2.94	0.75	0.74	1.28
10	32.12	32.15	31.19	31.04	28.79	0.59	0.14	2.90	0.20	0.45
11	31.66	29.80	30.67	30.82	29.08	1.55	1.83	0.04	0.13	2.09
12	32.71	29.74	31.24	28.99	30.39	0.01	0.62	0.69	1.44	0.40
13	31.79	28.57	29.09	30.49	27.71	1.13	3.61	0.72	0.55	1.22
14	32.19	27.59	28.71	30.82	28.32	2.20	1.04	0.98	0.40	2.17
15	29.99	28.41	29.32	28.96	30.16	1.51	0.57	1.04	0.04	2.68
16	30.81	29.90	30.91	30.01	28.94	0.63	1.69	0.18	0.48	0.40
17	28.98	29.75	29.13	26.08	29.85	0.38	0.18	0.25	3.25	1.22
18	31.25	28.96	37.39	28.99	31.52	4.67	4.26	1.19	2.04	1.24
Max	32.71	32.15	37.39	31.04	31.52	4.67	4.26	2.92	3.25	2.68
Min	26.90	26.82	27.41	26.08	25.38	0.01	0.01	0.04	0.00	0.30
Aver	29.78	28.94	29.63	28.58	28.24	1.49	1.37	1.06	0.78	1.24



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

**Group E:**

No.	Initial				
	6-1	6-2	6-3	6-4	6-5
1	27.98	25.74	27.80	26.61	25.78
2	28.09	27.29	31.63	27.80	28.29
3	29.04	25.72	30.22	26.42	27.46
4	28.87	25.69	28.31	26.47	27.41
5	28.67	25.20	28.60	25.43	26.16
6	29.35	25.09	27.37	25.74	26.12
7	29.39	26.24	30.57	26.89	26.78
8	30.83	26.16	29.06	26.11	26.56
9	34.87	29.66	33.98	31.91	31.08
10	29.64	27.79	31.08	31.00	29.46
11	32.94	26.61	32.23	28.00	29.57
12	38.02	27.23	32.44	29.57	27.59
13	31.48	26.22	31.31	28.79	28.98
14	28.96	27.78	32.66	28.64	28.60
15	29.41	28.39	30.31	29.74	29.65
16	33.90	31.80	31.54	32.75	31.99
17	32.62	27.36	32.10	31.36	31.04
18	38.42	27.15	29.21	25.05	28.61
Max	38.42	31.80	33.98	32.75	31.99
Min	27.98	25.09	27.37	25.05	25.78
Aver	31.25	27.06	30.58	28.24	28.40



## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

No.	After Durability					$\Delta$ LLCR(After Durability)				
	6-1	6-2	6-3	6-4	6-5	6-1	6-2	6-3	6-4	6-5
1	27.77	25.96	28.47	27.91	27.67	0.21	0.22	0.68	1.30	1.89
2	28.49	27.61	29.97	29.02	28.51	0.40	0.32	1.66	1.22	0.21
3	28.86	26.90	28.38	26.98	27.07	0.17	1.18	1.84	0.57	0.39
4	32.33	26.44	28.02	26.18	27.59	3.46	0.75	0.29	0.30	0.17
5	27.15	25.76	26.83	27.19	26.69	1.52	0.56	1.76	1.76	0.53
6	26.48	26.08	26.74	26.94	26.23	2.87	0.98	0.64	1.20	0.11
7	27.16	26.94	27.63	27.29	27.31	2.24	0.70	2.94	0.40	0.53
8	26.65	27.17	27.10	27.82	28.22	4.19	1.01	1.96	1.71	1.66
9	32.81	31.21	33.05	31.56	31.01	2.05	1.55	0.93	0.35	0.06
10	28.97	28.27	30.03	31.27	29.43	0.68	0.48	1.05	0.27	0.02
11	38.55	28.18	30.36	28.77	30.48	5.62	1.58	1.86	0.77	0.90
12	38.76	26.72	30.04	30.91	30.93	0.74	0.51	2.40	1.34	3.34
13	29.74	27.00	30.94	28.60	31.61	1.74	0.78	0.36	0.20	2.63
14	28.62	27.51	30.44	28.64	30.30	0.33	0.26	2.23	0.00	1.70
15	30.31	29.79	32.49	32.13	31.87	0.90	1.40	2.18	2.39	2.21
16	36.51	30.52	34.81	34.63	33.62	2.61	1.27	3.27	1.88	1.63
17	35.53	28.72	30.38	30.29	32.80	2.91	1.37	1.72	1.07	1.76
18	49.75	27.92	31.96	29.28	28.93	11.33	0.77	2.75	4.23	0.32
Max	49.75	31.21	34.81	34.63	33.62	11.33	1.58	3.27	4.23	3.34
Min	26.48	25.76	26.74	26.18	26.23	0.17	0.22	0.29	0.00	0.02
Aver	31.91	27.70	29.87	29.19	29.46	2.44	0.87	1.70	1.16	1.12

## PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130315-01

GL-P-027-005

No.	After Mechanical shock					$\Delta$ LLCR(After Mechanical shock)				
	6-1	6-2	6-3	6-4	6-5	6-1	6-2	6-3	6-4	6-5
1	25.21	26.15	28.49	27.44	26.24	2.77	0.41	0.69	0.83	0.46
2	26.56	28.17	29.68	29.14	28.82	1.54	0.88	1.95	1.34	0.52
3	26.04	26.33	28.41	27.60	26.41	3.00	0.61	1.81	1.18	1.05
4	25.63	25.94	27.13	26.45	27.20	3.24	0.25	1.18	0.02	0.22
5	24.97	25.73	27.09	25.38	26.55	3.70	0.53	1.51	0.05	0.39
6	24.74	26.46	27.11	25.69	26.74	4.62	1.37	0.27	0.05	0.62
7	25.90	26.17	28.19	26.70	27.84	3.50	0.07	2.38	0.19	1.05
8	26.41	26.54	27.76	27.54	28.94	4.43	0.38	1.30	1.43	2.38
9	34.09	31.99	33.01	31.34	30.57	0.77	2.33	0.97	0.57	0.51
10	30.79	29.31	29.70	29.52	27.92	1.14	1.52	1.39	1.48	1.54
11	35.65	28.18	28.80	29.24	30.79	2.71	1.57	3.43	1.24	1.21
12	41.13	30.37	29.56	29.18	30.79	3.11	3.14	2.88	0.39	3.20
13	30.97	28.55	29.51	28.39	30.31	0.50	2.33	1.80	0.40	1.33
14	31.62	29.28	29.32	29.25	31.02	2.66	1.51	3.34	0.61	2.43
15	30.93	30.02	30.62	31.34	30.19	1.52	1.63	0.31	1.60	0.54
16	33.17	31.18	34.56	32.68	32.89	0.73	0.62	3.02	0.07	0.90
17	35.27	29.89	38.57	32.69	31.23	2.65	2.54	6.47	1.33	0.19
18	36.18	26.43	31.38	28.83	29.37	2.24	0.72	2.17	3.78	0.76
Max	41.13	31.99	38.57	32.69	32.89	4.62	3.14	6.47	3.78	3.20
Min	24.74	25.73	27.09	25.38	26.24	0.50	0.07	0.27	0.02	0.19
Aver	30.29	28.15	29.94	28.80	29.10	2.49	1.24	2.05	0.92	1.07

### Group G:

I=1.5A

	sample 1	sample 2	sample 3	sample 4	sample 5
Initial	20.00	19.68	22.33	19.64	20.58
Max	28.88	29.95	32.47	26.64	27.52
$\Delta$ Temp	8.88	10.27	10.14	7.00	6.94



## **Properties of Sumikasuper LCP SV6808THF**

		ASTM	Unit	SV6808THF
Specific gravity		D792		1.72
Mold shrinkage rate	MD	Sumitomo chemical method	%	0.22
	TD		%	0.91
Tensile		Strength	D638	100MPa
		Elongation		4.30%
Flexural	Strength	D790	MPa	127
	Modulus		GPa	9.3
Izod impact strength	D256	J/m		590
TDUL 1.82MPa		D648	Degree C	270

1. The tool of 64mmX64mmX3mmt was used.
2. The highest temperature at which the test piece does not deform after immersing in a solder bath for 60 seconds.

\* The above physical properties data are just for reference, and are not intended for any warranty or guaranty on the materials stated in this brochure.

- End of document -

SUMITOMO CHEMICAL CO LTD  
ELECTRONIC MATERIALS DIV, TOKYO SUMITOMO TWIN BLDG, 27-1 SHINKAWA 2-CHOME, CHUO-KU TOKYO 104-8260 JP

SV6808THF(r5)  
Liquid Crystal Polymer (LCP), "SUMIKASUPER", furnished as pellets

Color	Min Thk (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str
NC, BK	0.3	V-0	-	-	130	130	130
	3.0	V-0	-	-	130	130	130
Comparative Tracking Index (CTI): -				Inclined Plane Tracking (IPT): -			
Dielectric Strength (kV/mm): -				Volume Resistivity (10 <sup>x</sup> ohm-cm) : -			
High-Voltage Arc Tracking Rate (HVTR): -				High Volt, Low Current Arc Resis (D495): -			
Dimensional Stability (%): -							
(r5) - Virgin and regrind material up to 70% by weight have the same V-0 flammability characteristics. No other properties have been evaluated for 25% - 70% regrind.							

ANSI/UL 94 small-scale test data does not pertain to building materials, furnishings and related contents. ANSI/UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by UL.

Report Date:2012-12-26  
Last Revised:2012-12-27

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IEC and ISO Test Methods

Test Name	Test Method	Units	Thickness Tested (mm)	Value
Flammability	IEC 60695-11-10	Class (color)	0.3	V-0 (NC, BK)
			3.0	V-0 (NC, BK)
Glow-Wire Flammability (GWFI)	IEC 60695-2-12	C	-	-
Glow-Wire Ignition (GWIT)	IEC 60695-2-13	C	-	-
IEC Comparative Tracking Index	IEC 60112	Volts (Max)	-	-
IEC Ball Pressure	IEC 60695-10-2	C	-	-
ISO Heat Deflection (1.80 MPa)	ISO 75-2	C	-	-
ISO Tensile Strength	ISO 527-2	MPa	-	-
ISO Flexural Strength	ISO 178	MPa	-	-
ISO Tensile Impact	ISO 8256	kJ/m <sup>2</sup>	-	-
ISO Izod Impact	ISO 180	kJ/m <sup>2</sup>	-	-
ISO Charpy Impact	ISO 179-2	kJ/m <sup>2</sup>	-	-

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以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as) :

送樣廠商(Sample Submitted By) : SUMITOMO CHEMICAL CO., LTD.  
 樣品名稱(Sample Description) : SUMIKASUPER LCP RESIN  
 樣品型號(Style/Item No.) : SUMIKASUPER E6006LMRB & E4008MRB & E6008MRB & E5008LB & E5006LB & E6807LHFBZ & E6808UHFBZ & E6808LHFBZ & E6007LHFBZ & E6810LHFBZ & E6810GHFBZ & E6810KHFBZ & E6810MRB & SZ6505HFB & SZ6506HFB & E6809CHFBZ & E6208LHFBZ & SV6808THFB & SV6808GHFB & SV6807B  
 收件日期(Sample Receiving Date) : 2015/04/16  
 測試期間(Testing Period) : 2015/04/16 TO 2015/04/22

### 測試需求(Test Requested) :

- (1) 依據客戶要求, 參考RoHS 2011/65/EU Annex II 指令測試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚. (As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs contents in the submitted sample.)
- (2) 依據客戶要求, 參考 WTO/TBT 通報 G/TBT/N/EU/256, 檢測 DBP, BBP, DEHP, DIBP. (As specified by client, with reference to G/TBT/N/EU/256 of WTO/TBT to test DBP, BBP, DEHP, DIBP.)
- (3) 其他測試項目請見下一頁 . / Please refer to next pages for the other item(s).

測試結果(Test Results) : 請見下一頁 (Please refer to next pages).

  
 Troy Chang, Manager - Tech  
 Signed for and on behalf of  
 SGS TAIWAN LTD.  
 Chemical Laboratory - Taipei

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測試結果(Test Results)

測試部位(PART NAME)No.1 : 黑色塑膠粒 (BLACK PLASTIC PELLETS)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				No.1
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321-5: 2013方法, 以感應 耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	n.d.
鉛 / Lead (Pb)	mg/kg	參考IEC 62321-5: 2013方法, 以感應 耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	n.d.
汞 / Mercury (Hg)	mg/kg	參考IEC 62321-4: 2013方法, 以感應 耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321-4: 2013 and performed by ICP-AES.	2	n.d.
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	參考IEC 62321: 2008方法, 以UV-VIS 檢測. / With reference to IEC 62321: 2008 and performed by UV- VIS.	2	n.d.
銻 / Antimony (Sb)	mg/kg	參考US EPA 3050B方法, 以感應耦合電 漿原子發射光譜儀檢測. / With reference to US EPA Method 3050B. Analysis was performed by ICP-AES.	2	n.d.
三氧化二銻 / Antimony trioxide (Sb <sub>2</sub> O <sub>3</sub> )* (CAS No.: 1309-64-4)	mg/kg	參考US EPA 3050B方法, 以感應耦合電 漿原子發射光譜儀檢測. / With reference to US EPA Method 3050B. Analysis was performed by ICP- AES.*	-	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				No.1
六溴環十二烷及所有主要被辨別出的異構物 / Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified ( $\alpha$ - HBCDD, $\beta$ - HBCDD, $\gamma$ - HBCDD) (CAS No.: 25637-99-4 and 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))	mg/kg	參考IEC 62321: 2008方法, 以氣相層析/質譜儀檢測. / With reference to IEC 62321: 2008 method. Analysis was performed by GC/MS.	5	n.d.
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之. / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之. / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二(2-乙基己基)酯 / DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之. / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二異丁酯 / DIBP (Di- isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之. / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				No.1
鄰苯二甲酸二異癸酯 / DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之。 / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二異壬酯 / DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之。 / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之。 / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二戊酯 / Di-n-pentyl phthalate (CAS No.: 131-18-0)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之。 / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二(2-甲氧基乙基)酯 / DMEP (Bis (2-methoxyethyl) phthalate) (CAS No.: 117-82-8)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之。 / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二己酯 / DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3)	mg/kg	參考IEC 62321-8 (111/321/CD), 以氣相層析儀/質譜儀檢測之。 / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				No.1
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	參考US EPA 3550C: 2007方法, 以液相層析/質譜儀檢測. / With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
全氟辛酸 / PFOA (CAS No.: 335-67-1)	mg/kg	參考US EPA 3550C: 2007方法, 以液相層析/質譜儀檢測. / With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
多溴聯苯總和 / Sum of PBBs	mg/kg	參考IEC 62321: 2008方法, 以氣相層析/質譜儀檢測. / With reference to IEC 62321: 2008 and performed by GC/MS.	-	n.d.
一溴聯苯 / Monobromobiphenyl	mg/kg		5	n.d.
二溴聯苯 / Dibromobiphenyl	mg/kg		5	n.d.
三溴聯苯 / Tribromobiphenyl	mg/kg		5	n.d.
四溴聯苯 / Tetrabromobiphenyl	mg/kg		5	n.d.
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n.d.
六溴聯苯 / Hexabromobiphenyl	mg/kg		5	n.d.
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n.d.
八溴聯苯 / Octabromobiphenyl	mg/kg		5	n.d.
九溴聯苯 / Nonabromobiphenyl	mg/kg		5	n.d.
十溴聯苯 / Decabromobiphenyl	mg/kg		5	n.d.
多溴聯苯醚總和 / Sum of PBDEs	mg/kg		-	n.d.
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg		5	n.d.
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg		5	n.d.
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n.d.
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg		5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg		5	n.d.
六溴聯苯醚 / Hexabromodiphenyl ether	mg/kg		5	n.d.
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg		5	n.d.
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg		5	n.d.
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg		5	n.d.
十溴聯苯醚 / Decabromodiphenyl ether	mg/kg		5	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				No.1
鹵素 / Halogen				
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	參考BS EN 14582:2007, 以離子層析儀 分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	1190
鹵素 (氯) / Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	n.d.
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.
鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.

### 備註(Note) :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. "-" = Not Regulated (無規格值)
5. \*\*\*: 該物質是由銻之測試結果計算得知. 其MDL是針對銻之評估. (The substance was calculated by the test result of Antimony. The MDL was evaluated for Antimony.)
6. 參數換算表 / Parameter Conversion Table :  
Please refer to [http://twap.sgs.com/sgsrsts/chn/download-REACH\\_tw.asp](http://twap.sgs.com/sgsrsts/chn/download-REACH_tw.asp)

### PFOS參考資訊(Reference Information) : 持久性有機污染物 POPs - (EU) 757/2010

PFOS濃度在物質或製備中不得超過0.001%(10ppm), 在半成品、成品或零部件中不得超過0.1%(1000ppm), 在紡織品或塗層材料中不得超過1µg/m<sup>2</sup>。

(Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1µg/m<sup>2</sup>.)

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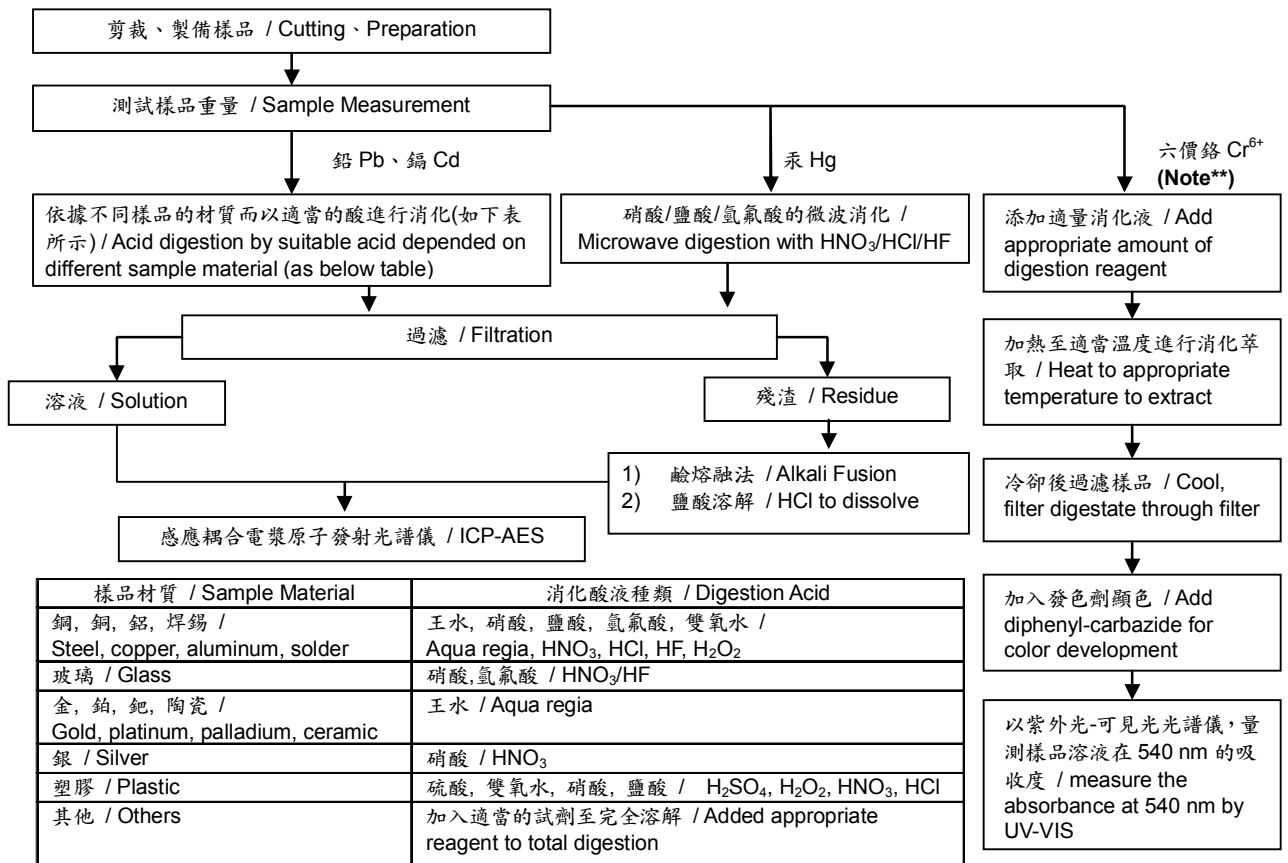
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11F, NO. 369, FU-HSING N. ROAD, TAIPEI, 105 TAIWAN, R. O. C.



- 1) 根據以下的流程圖之條件，樣品已完全溶解。(六價鉻測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)
- 2) 測試人員：楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



### Note\*\* (For IEC 62321)

- (1) 針對非金屬材料加入鹼性消化液，加熱至 90~95°C 萃取。 / For non-metallic material, add alkaline digestion reagent and heat to 90~95°C.
- (2) 針對金屬材料加入純水，加熱至沸騰萃取。 / For metallic material, add pure water and heat to boiling.

## 測試報告 Test Report

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華立企業股份有限公司

WAH LEE INDUSTRIAL CORP.

台北市復興北路369號11樓

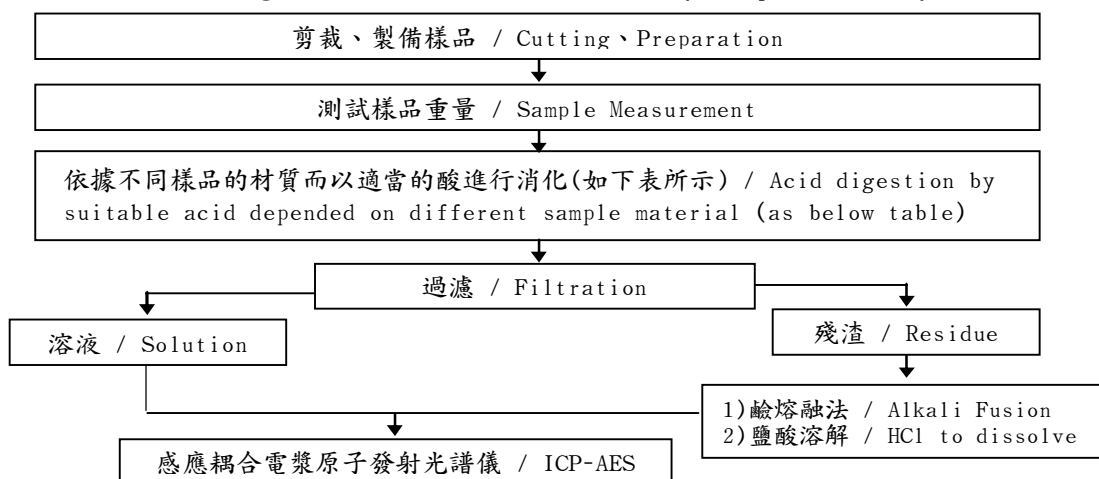
11F, NO. 369, FU-HSING N. ROAD, TAIPEI, 105 TAIWAN, R. O. C.



- 1) 根據以下的流程圖之條件，樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) 測試人員：楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang

### 元素以 ICP-AES 分析的消化流程圖

(Flow Chart of digestion for the elements analysis performed by ICP-AES)



銅,銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氟酸,雙氧水 / Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
玻璃 / Glass	硝酸,氫氟酸 / HNO <sub>3</sub> /HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO <sub>3</sub>
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl
其他 / Others	加入適當的試劑至完全溶解 / Added appropriate reagent to total digestion

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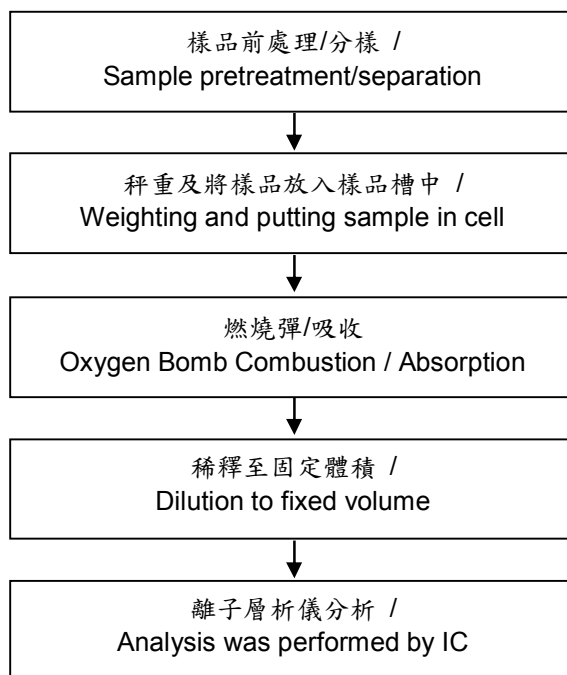
台北市復興北路369號11樓

11F, NO. 369, FU-HSING N. ROAD, TAIPEI, 105 TAIWAN, R. O. C.



## 鹵素分析流程圖 / Analytical flow chart of halogen content

- 測試人員：陳恩臻 / Name of the person who made measurement: Rita Chen
- 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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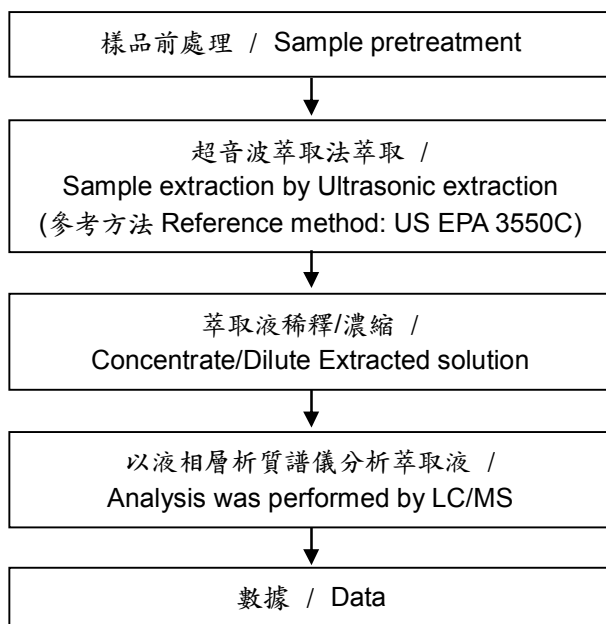
台北市復興北路369號11樓

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### 全氟辛酸/全氟辛烷磺酸分析流程圖 / PFOA/PFOS analytical flow chart

- 測試人員：翁賜彬 / Name of the person who made measurement: Roman Wong
- 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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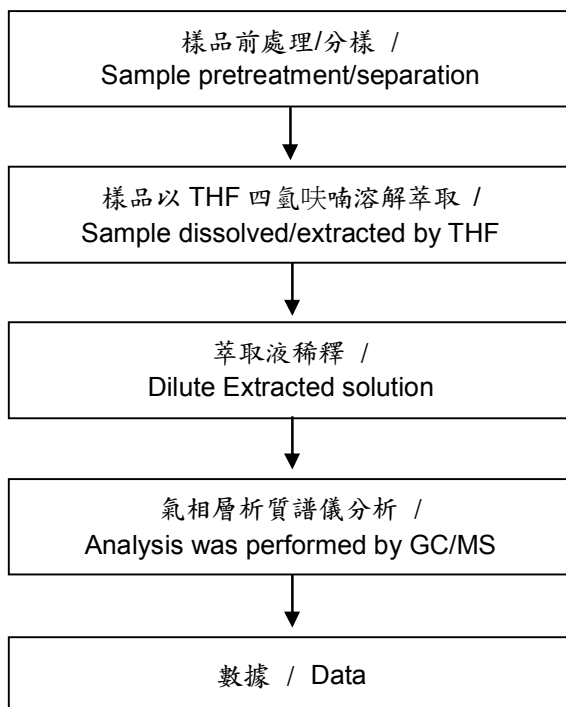
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### 可塑劑分析流程圖 / Analytical flow chart of phthalate content

- 測試人員：徐毓明 / Name of the person who made measurement: Andy Shu
- 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang

#### 【測試方法/Test method: IEC 62321-8】



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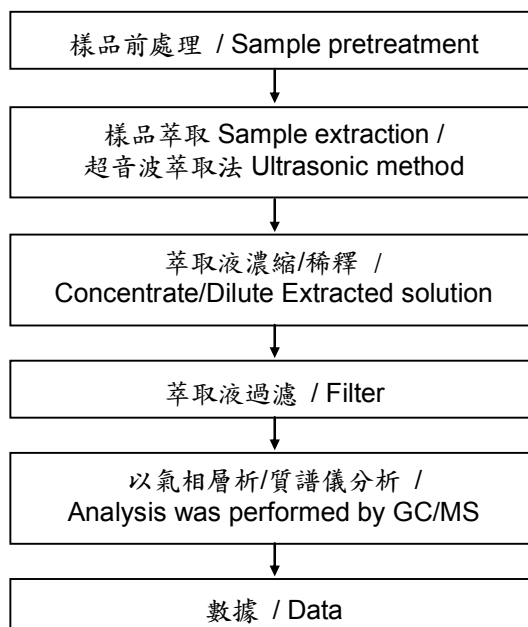
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### 六溴環十二烷分析流程圖 / HBCDD analytical flow chart

- 測試人員：翁賜彬 / Name of the person who made measurement: Roman Wong
- 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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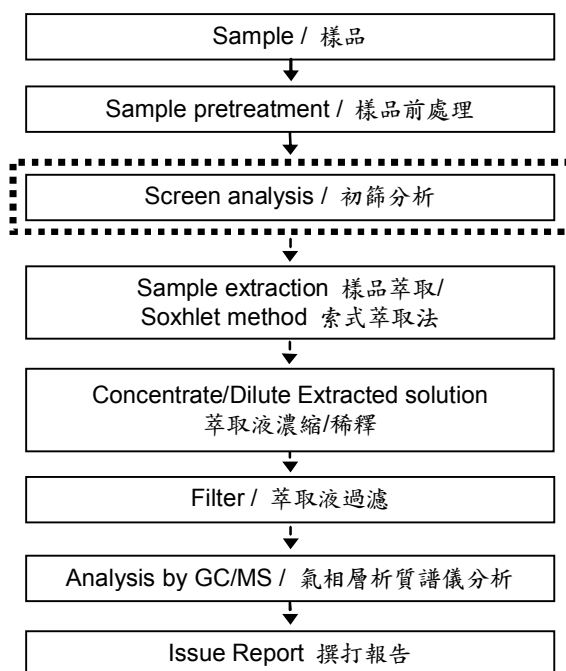
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### 多溴聯苯/多溴聯苯醚分析流程圖 / PBB/PBDE analytical FLOW CHART

- 測試人員：翁賜彬 / Name of the person who made measurement: Roman Wong
  - 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang
- 初次測試程序 / First testing process —————→
- 選擇性篩檢程序 / Optional screen process .....→
- 確認程序 / Confirmation process - - - - -→



## 測試報告

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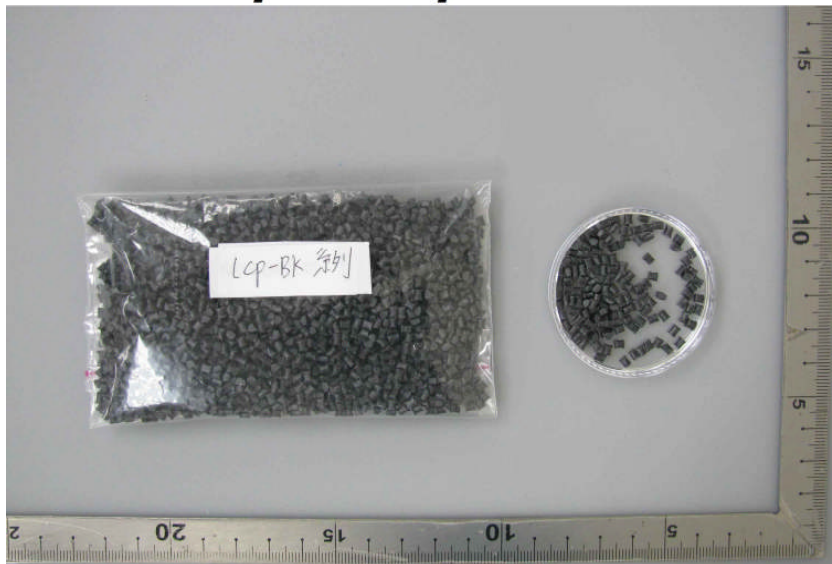
11F, NO. 369, FU-HSING N. ROAD, TAIPEI, 105 TAIWAN, R. O. C.



\* 照片中如有箭頭標示，則表示為實際檢測之樣品/部位。\*

(The tested sample / part is marked by an arrow if it's shown on the photo.)

### CE/2015/43413



\*\* 報告結尾 (End of Report) \*\*

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**INSPECTION CERTIFICATE according to EN10204 3.1**

**Our Reference:**  
Shipping Zutphen

**Certificate No:**  
13 05453

**Date:**  
19-09-2013

**Customer:**

**AURUBIS AHE MATERIAL D.C.**

(Shanghai) Co.Ltd.Section A  
1th Fl. No.211 Fute Road  
Waigaoqiao Free Trade Zone  
200131 SHANGHAI China.

**Description:** BRSTRP 305 X 0.15 MM

**Order No/Ref:** PO000366B

**Mark:**

**Part No:**

**Order No:** 378759 / 1

**Alloy - Temper:** 1065 - 95

**Norm Specification:**

**Our part no:** 768719

**Net weight:** 911 kg

**CHEMICAL COMPOSITION**

	Coil	Cu min/max	Zn min/max
<b>Specified values:</b>		64,5 / 66,5	33,5 / 35,5
<b>Actual values:</b>	<b>214524</b>	65,7 / 66,0	Remainder

**DIMENSIONAL REQUIREMENTS**

	Coil	Thickness min/max mm	x	s	n	Width min/max mm
<b>Specified values:</b>		0,143 / 0,157				304,85 / 305,15
<b>Actual values:</b>	<b>214524</b>	0,147 / 0,154	0,149	0,0013	794	304,98 / 304,98

**MECHANICAL PROPERTIES**

	Coil	Hardness (Vickers) min/max	Tensile strength N/mm2 min/max
<b>Specified values:</b>		180 / 210	565 / 635
<b>Actual values:</b>	<b>214524</b>	194 / 195	635 / 635

All properties stated on this document are according to your specifications

**This document is generated automatically and therefore not signed.**

**AURUBIS NETHERLANDS B.V.**

Oostzeestraat 1, P.O. Box 2, 7200 AA Zutphen, The Netherlands

Tel. +31 575 594 594, Fax +31 575 512 171

K.v.K. Apeldoorn 52930610, VAT NL850670676B01

# Test Report

Report No. ECL01G032680001

Page 1 of 4

Applicant LOTES SUZHOU CO.,LTD

Address NO.26,CAOHU ROAD,XIANGCHENG ECONOMIC DEVELOPMENT SUZHOU

The following sample(s) and sample information was/were submitted and identified by/on the behalf of the client

Sample Name Brass Strip  
Part No. SM1065  
Color Yellow  
Material Brass  
Buyer LOTES SUZHOU CO.,LTD  
Manufacturer Aurubis Netherlands BV  
Sample Received Date Dec. 19, 2014  
Testing Period Dec. 19, 2014 to Dec. 24, 2014

Test Requested As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium(Cr(VI)) in the submitted sample(s).

Test Method Please refer to the following page(s).

Test Result(s) Please refer to the following page(s).

## Conclusion

Tested Sample	According to directive	Result
Submitted Sample	2011/65/EU*	Pass

\*2011/65/EU is a new version of RoHS Directive (2002/95/EC), which focuses on restriction of the use of certain hazardous substances (Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs)) in electrical and electronic equipment.

Pass means that the results shown on the report do not exceed the limits set by RoHS Directive 2011/65/EU.

Tested by

*Ada*

Reviewed by

*Xu Jing*

Approved by

*Su Hongwei*

Date

Dec. 24, 2014



Su Hongwei

Senior Laboratory Manager

No. R108720593

Centre Testing International Co.,Ltd. Shanghai Branch

No.1996,New Jinqiao Road, Pudong District,Shanghai,China



# Test Report

**Report No.** ECL01G032680001

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## Test Method

Test Item(s)	Test Method	Measured Equipment(s)
Lead (Pb)	IEC 62321-5:2013 Ed.1.0	ICP-OES
Cadmium (Cd)	IEC 62321-5:2013 Ed.1.0	ICP-OES
Mercury (Hg)	IEC 62321-4:2013 Ed.1.0	ICP-OES
Hexavalent Chromium(Cr(VI))	IEC 62321:2008 Ed.1 Annex B	UV-Vis

## Test Result(s)

Tested Item(s)	Result	MDL	Limit of Directive 2011/65/EU
Lead (Pb)	25 mg/kg	2 mg/kg	1000 mg/kg
Cadmium (Cd)	N.D.	2 mg/kg	100 mg/kg
Mercury (Hg)	N.D.	2 mg/kg	1000 mg/kg
Hexavalent Chromium(Cr(VI))	Negative	/	1000 mg/kg

## Tested Sample/Part Description

Golden metal

**Note:** The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.

-MDL = Method Detection Limit

-N.D. = Not Detected (<MDL )

-mg/kg = ppm = parts per million

-Negative = Absence of Cr(VI) , the detected Cr(VI) concentration in the boiling water extraction solution is less than 0.02 mg/kg with 50cm<sup>2</sup> sample surface area used.

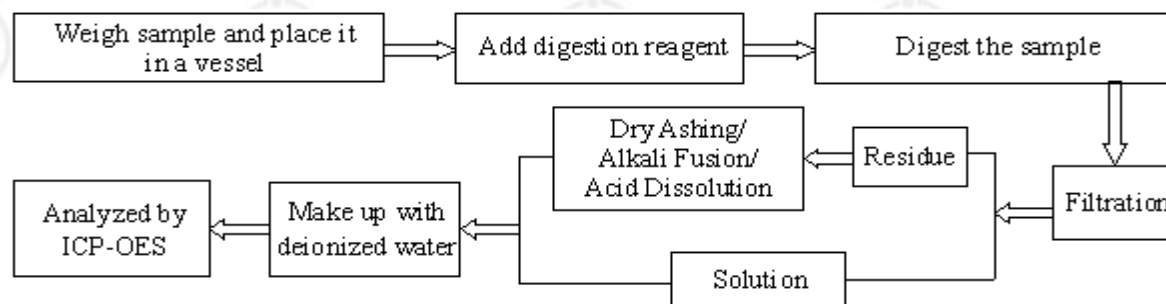
# Test Report

Report No. ECL01G032680001

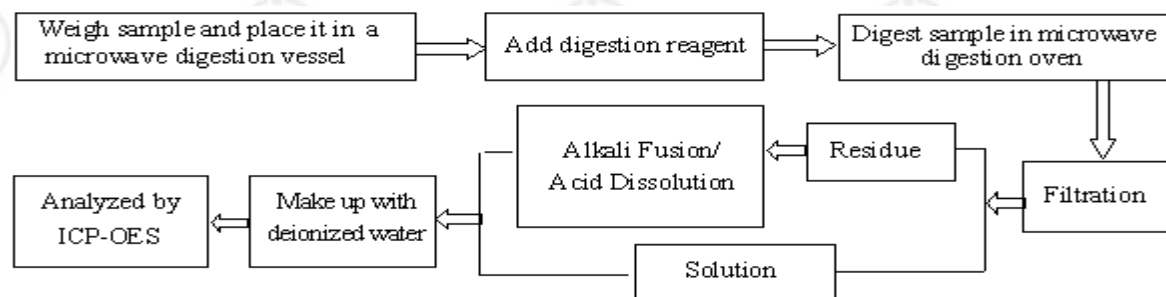
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## Test Process

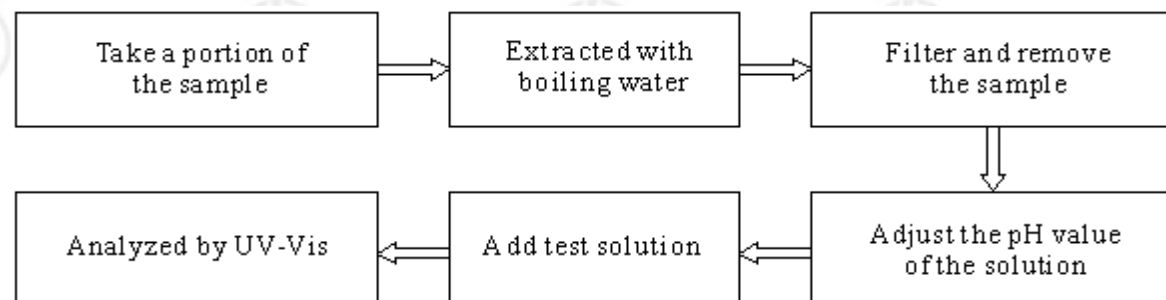
### 1. Lead (Pb), Cadmium (Cd)



### 2. Mercury (Hg)



### 3. Hexavalent Chromium(Cr(VI))



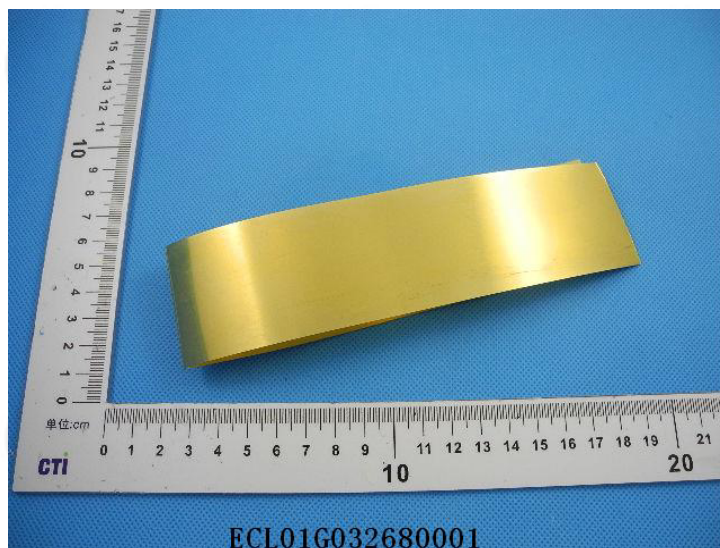


# Test Report

Report No. ECL01G032680001

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## Photo(s) of the sample(s)



\*\*\* End of report \*\*\*

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.



# 检测报告 Test Report

报告编号 ECL01H008714001E  
Report No. ECL01H008714001E

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Page 1 of 6

申请单位 得意精密电子(苏州)有限公司  
Applicant LOTES(SUZHOU) CO.,LTD  
地 址 江苏省苏州市相城经济开发区漕湖大道26号  
Address NO.26 CAO HU ROAD XIANGCHENG ECONOMIC DEVELOPMENT ZONE,SUZHOU CHINA

以下测试之样品及样品信息由申请者提供并确认

The following sample(s) and sample information was/were submitted and identified by/on the behalf of the client

样品名称 镀层Ni Sn Au  
Sample Name Coating material Ni Sn Au  
材料名称  
Material C1065  
样品接收日期 2015.02.28  
Sample Received Date Feb. 28, 2015  
样品检测日期 2015.02.28-2015.03.05  
Testing Period Feb. 28, 2015 to Mar. 5, 2015

检测要求 根据客户要求, 对所提交样品中的铅(Pb), 镉(Cd), 汞(Hg), 六价铬(Cr(VI)), 全氟辛酸磺酸盐(PFOS)进行测试。  
Test Requested As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium(Cr(VI)), Perfluorooctane Sulfonates(PFOS) in the submitted sample(s).

检测依据/检测结果 请参见下页。  
Test Method/Test Result(s) Please refer to the following page(s).

主 检  
Tested by Ada  
批 准  
Su Hongwei  
Approved by  
Su Hongwei

审 核  
Reviewed by Gu Cuili  
日 期  
Date 2015.03.05



Senior Laboratory Manager

No. R187771263

华测检测技术股份有限公司上海分公司  
Centre Testing International Co.,Ltd. Shanghai Branch

上海市浦东新区新金桥路1996号  
No.1996,Xinjinqiao Road, Pudong New District, Shanghai, China

# 检测报告 Test Report

报告编号 ECL01H008714001E  
Report No. ECL01H008714001E

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Page 2 of 6

## 检测依据 Test Method

测试项目 Test Item(s)	测试方法 Test Method	测试仪器 Measured Equipment(s)
铅(Pb) Lead (Pb)	参考 IEC 62321-5:2013 Ed. 1.0 Refer to IEC 62321-5:2013 Ed.1.0	ICP-OES
镉(Cd) Cadmium (Cd)	参考 IEC 62321-5:2013 Ed. 1.0 Refer to IEC 62321-5:2013 Ed.1.0	ICP-OES
汞(Hg) Mercury (Hg)	参考 IEC 62321-4:2013 Ed. 1.0 Refer to IEC 62321-4:2013 Ed.1.0	ICP-OES
六价铬(Cr(VI)) Hexavalent Chromium(Cr(VI))	IEC 62321:2008 Ed.1 Annex B	UV-Vis
全氟辛酸磺酸盐(PFOS) Perfluorooctane Sulfonates(PFOS)	参考 US EPA 3550C:2007 & US EPA 8321B:2007 Refer to US EPA 3550C:2007 & US EPA 8321B:2007	LC-MS-MS

## 检测结果 Test Result(s)

测试项目 Test Item(s)	结果 Result	方法检出限 MDL
铅(Pb) Lead (Pb)	36 mg/kg	2 mg/kg
镉(Cd) Cadmium (Cd)	N.D.	2 mg/kg
汞(Hg) Mercury (Hg)	N.D.	2 mg/kg
六价铬(Cr(VI)) Hexavalent Chromium(Cr(VI))	阴性 Negative	/

测试项目 Test Item(s)	结果 Result	方法检出限 MDL
全氟辛酸磺酸盐(PFOS) Perfluorooctane Sulfonates(PFOS)	N.D.	0.5 µg/m <sup>2</sup>

## 测试样品/部位描述

Tested Sample/Part Description

混测, 银白色, 金色镀层

Mixed test, silver-white, golden plating

# 检测报告 Test Report

报告编号 ECL01H008714001E  
Report No. ECL01H008714001E

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备注: 根据客户要求, 对样品进行混合测试, 测试结果不代表混合测试样品中任何一种单一材质的含量。

-N.D. = 未检出 (小于方法检出限)

-mg/kg= ppm = 百万分之一

-阴性表示不含有六价铬, 即由表面积为50cm<sup>2</sup>的样品所萃取出来的溶液中的六价铬的浓度小于0.02mg/kg

**Remark:** As specified by client, the test was conducted by mixing several samples together. The result(s) shown on this report may be different from the content of any homogeneous material.

-MDL = Method Detection Limit

-N.D. = Not Detected (<MDL)

-mg/kg = ppm = parts per million

-Negative = Absence of Cr(VI), the detected Cr(VI) concentration in the boiling water extraction solution is less than 0.02 mg/kg with 50cm<sup>2</sup> sample surface area used.

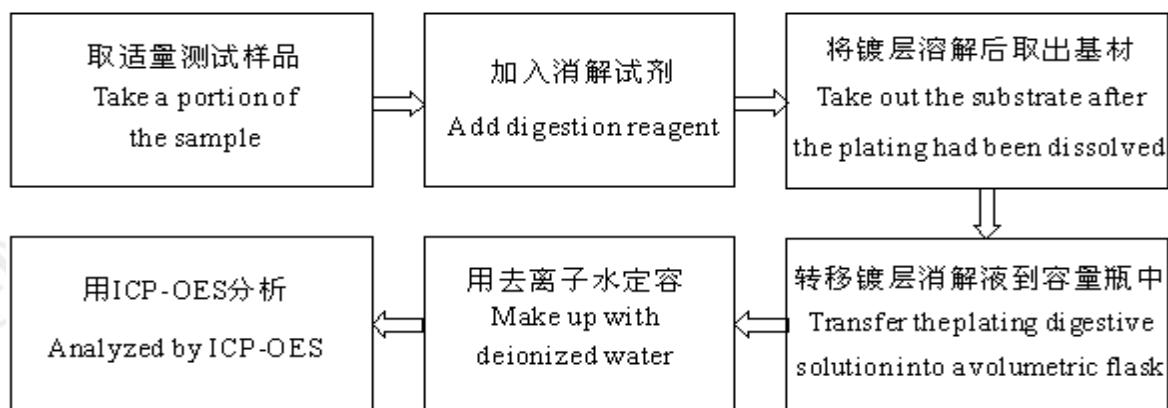
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Report No. ECL01H008714001E

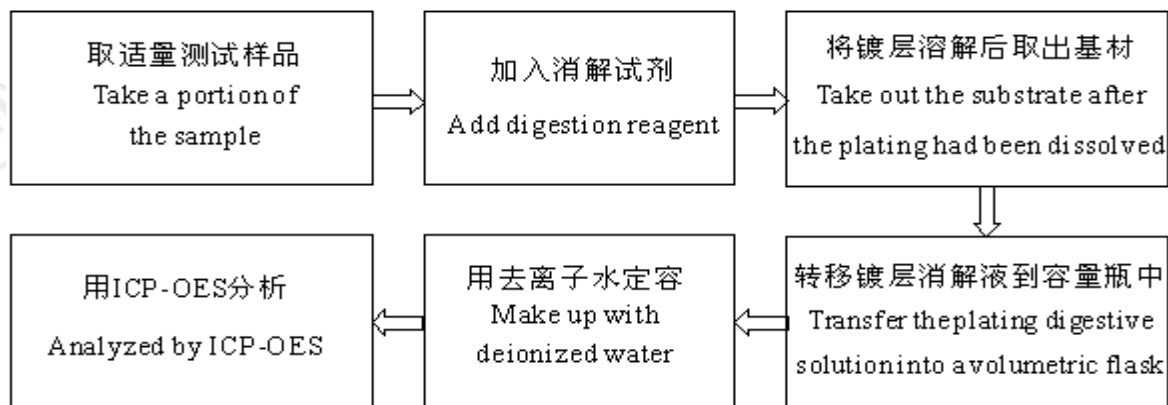
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## 检测流程 Test Process

### 1. 铅(Pb), 镉(Cd) Lead (Pb), Cadmium (Cd)



### 2. 汞(Hg) Mercury (Hg)

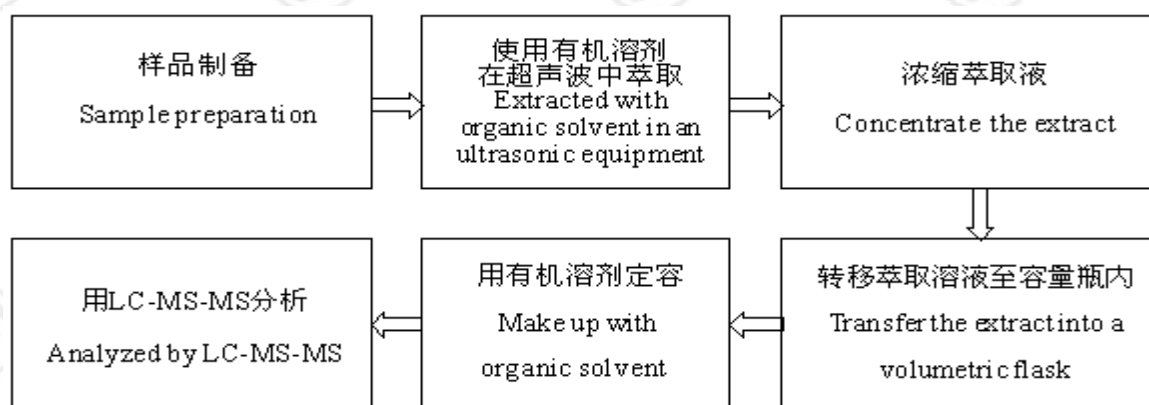


# 检测报告 Test Report

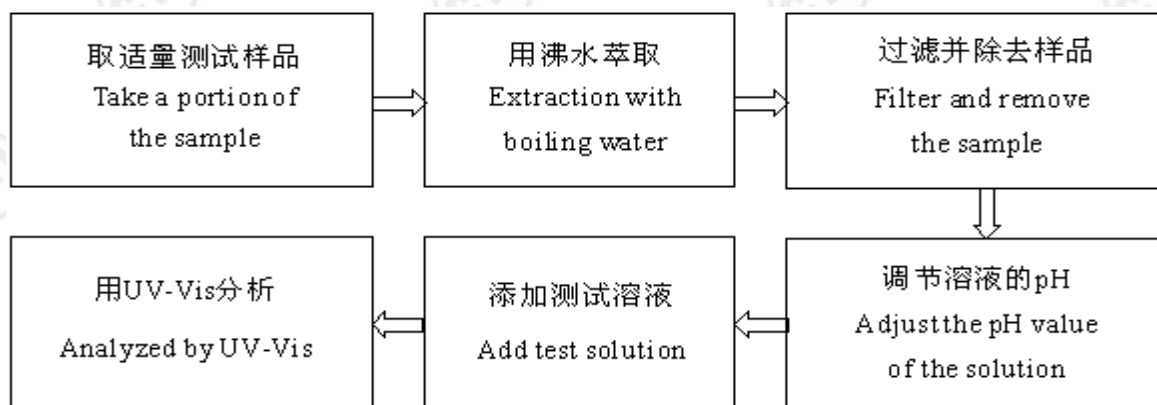
报告编号 ECL01H008714001E  
Report No. ECL01H008714001E

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## 3. 全氟辛烷磺酸盐 (PFOS) Perfluorooctane Sulfonates (PFOS)



## 4. 六价铬 (Cr(VI)) Hexavalent Chromium (Cr(VI))



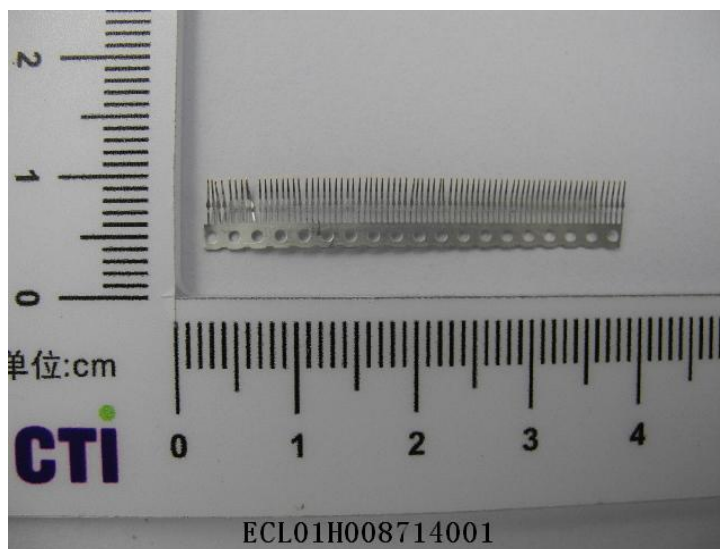


# 检测报告 Test Report

报告编号 ECL01H008714001E  
Report No. ECL01H008714001E

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## 样品图片 Photo(s) of the sample(s)



\*\*\*报告结束\*\*\*  
\*\*\* End of report \*\*\*

检测报告无批准人签字及“报告专用章”无效，本报告检测结果仅对受测样品负责。未经CTI书面同意，不得部分复制本报告。

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.

## Test Report

NO.: I09042023504D

Date: 2014.09.11

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Applicant:

Shanghai Hua Ken Electronics Technology Co.,Ltd.

Address:

Room 802, No.99, Feng Pu Avenue, Fengxian District, Shanghai China

The following sample(s) was/were submitted and identified on behalf of the client as:

Sample Name:

Industrial Print ink

Sample Model:

HI-68K

Sample Received Date:

2014.09.04

Test Period:

2014.09.04 To 2014.09.11

Reference Methods:

IEC62321 Edition 1.0: 2008 method: Regulated Substances Content of test process with Electrical & Electronic Products

(1) Lead Analysis is performed by AAS

(2) Cadmium Analysis is performed by AAS

(3) Mercury Analysis is performed by ICP-OES

(4) Hexavalent Chromium Analysis is performed by UV-Vis

(5) PBBs and PBDEs Analysis is performed by GC-MS

EN 14582: 2007 method, F, Cl, Br, I Analysis is performed by IC

EPA8061A:1996 method, Phthalate Analysis is performed by GC-MS

EPA8270D: 2007 method, HBCDD Analysis is performed by GC-MS

Test Result:

Please refer to next page(s)

Approved by:

*Zhang Dazhi*

Code: r7fq503z

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(021) 64851999

Building 6, Zhongxing Industry City, Chuangye Road, Nanshan District, Shenzhen  
(0755) 26050909

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Tel: (022) 27360730

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Test Result (Unit: mg/kg)

Test Item	MDL	Test Result	RoHS Limit
Lead (Pb)	1	N.D.	1000
Cadmium (Cd)	1	N.D.	100
Mercury (Hg)	1	N.D.	1000
Hexavalent Chromium (Cr <sup>6+</sup> )	1	N.D.	1000
PBBs	—	—	1000
Bromobiphenyl	5	N.D.	—
Dibromobiphenyl	5	N.D.	—
Tribromobiphenyl	5	N.D.	—
Tetrabromobiphenyl	5	N.D.	—
Pentabromobiphenyl	5	N.D.	—
Hexabromobiphenyl	5	N.D.	—
Heptabromobiphenyl	5	N.D.	—
Octabromobiphenyl	5	N.D.	—
Nonabromobiphenyl	5	N.D.	—
Decabromobiphenyl	5	N.D.	—
PBDEs	—	—	1000
Bromodiphenyl ether	5	N.D.	—
Dibromodiphenyl ether	5	N.D.	—
Tribromodiphenyl ether	5	N.D.	—
Tetrabromodiphenyl ether	5	N.D.	—
Pentabromodiphenyl ether	5	N.D.	—
Hexabromodiphenyl ether	5	N.D.	—
Heptabromodiphenyl ether	5	N.D.	—
Octabromodiphenyl ether	5	N.D.	—
Nonabromodiphenyl ether	5	N.D.	—
Decabromodiphenyl ether	5	N.D.	—

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Test Result (Unit: mg/kg)

Test Item	Test Result
HBCDD	Not Detected(<5)
DBP	Not Detected(<50)
BBP	Not Detected(<50)
DEHP	Not Detected(<50)
DIBP	Not Detected(<50)

Test Result (Unit: mg/kg)

Test Item	MDL	Test Result
F	50	N.D.
Cl	50	N.D.
Br	50	N.D.
I	50	N.D.

Note: (1) mg/kg = ppm

(2) "—" = Does not stipulate

(3) N.D. = Not Detected (&lt;MDL)

(4) MDL = Method Detection Limit

(5) The most allowable limit value reference to RoHS Directive 2011/65/EU Annex II

Photo:



Pony authenticate the photo on original report only

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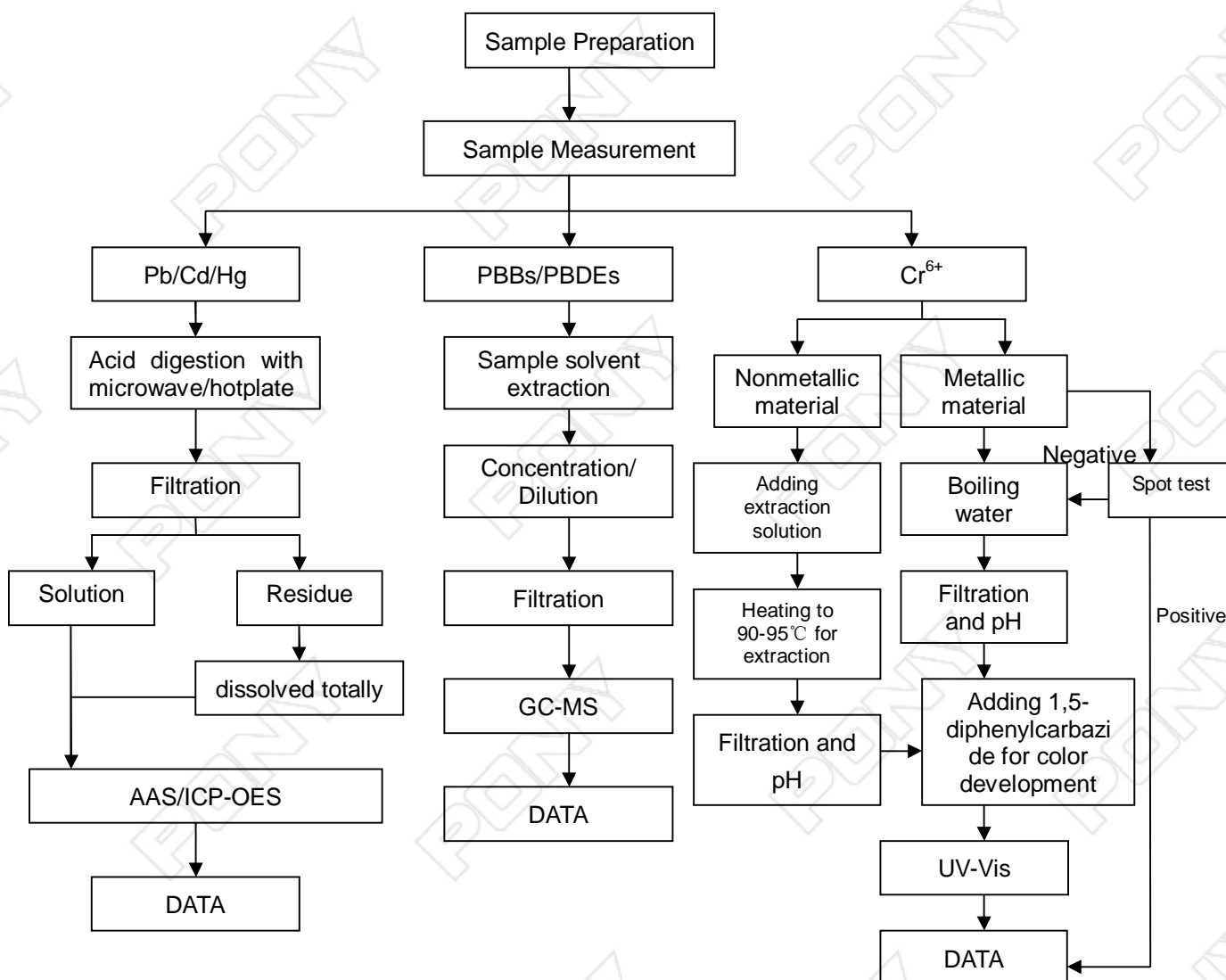
### Measurement Flow-chart

Tested by: Zhao Ting

Checked by: Cao Jia

Person in charge of the lab: Zhang Daiqin

These Samples Were Dissolved Totally By Pre-conditioning Method According To Below Flow Chart. ( $\text{Cr}^{6+}$  And PBBs/PBDEs Test Method Excluded)



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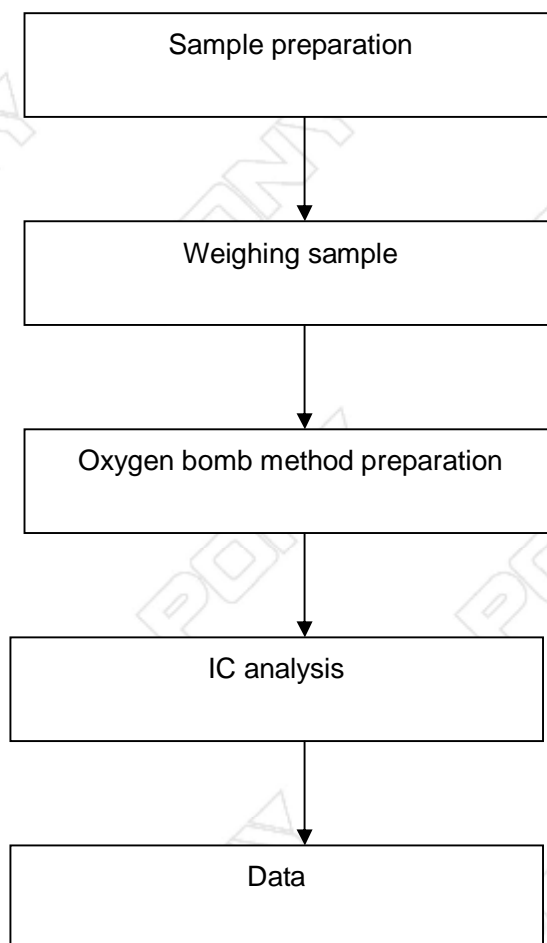
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### Halogen measurement flow-chart

Tested by: Zhang Tianyu

Checked by: Cao Jia

Person in charge of the lab: Zhang Daiqin



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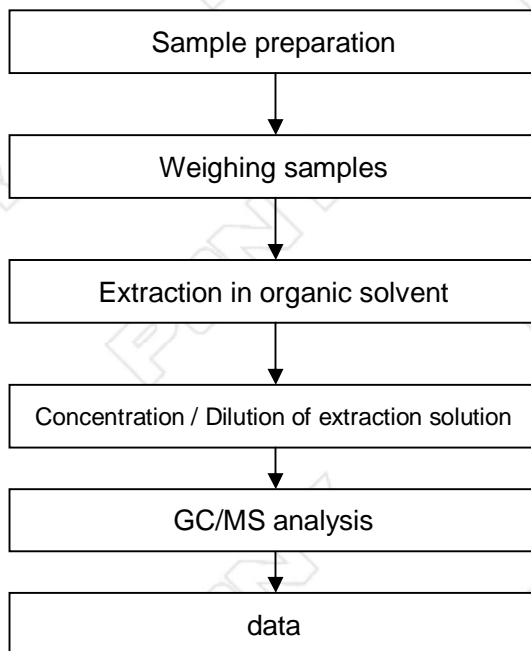
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### Phthalate Measurement Flow-chart

Tested by: Fan Suping

Checked by: Cao Jia

Person in charge of the lab: Zhang Daiqin



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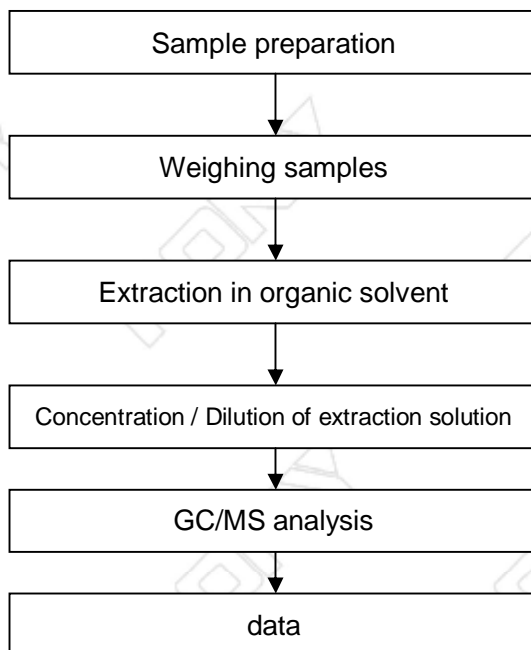
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### HBCDD Flow Chart

Tested by: Ji Erjie

Checked by: Cao Jia

Person in charge of the lab: Zhang Daiqin



\*\*\*End of Report\*\*\*

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