

TO :

Halogen Free Part

SPECIFICATION FOR APPROVAL

DESCRIPTION : 0.5mm M.2 H4.2 B-KEY;HF

CUSTOMER P/N :

LOTES P/N : APCI0105-P001A

CUSTOMER APPROVAL SIGN :

SEND BY	QA CONFIRM	R&D CONFIRM	PREPARE BY
		Ford	Jinjin Tu



Lotes SZ



Lotes GZ



Lotes TW

www.lotes.cc

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LOTES CO., LTD

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PAGE 7~11	PRODUCT DRAWING
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PRODUCT SPECIFICATION		REV	ECN No.																		
		1B	SN14***																		
<p>DIMENSION</p> <p>1.This specification covers M.2 connector.</p> <p>2.The physical dimensions and the M.2 connector are shown in drawing.</p> <p>MATERIAL AND FINISH</p> <p>1.Housing: High temperature thermoplastic, Color: Black;</p> <p>2. Contact: Copper Alloy, 50-120u” Nickel under plated, Au on contact area, Au on soldering area;</p> <p>3. SMT TAB: S50C, 50-120u”Nickel under plated, plating Tin (Matte)80-180u” over all;</p> <p>OPERATING PERFORMANCE</p> <p>1.Operation Temperature: -55℃ to 85℃</p> <p>2.Voltage Rating: 30V</p> <p>3.Current Rating: 0.5A</p> <p>ELECTRICAL PERFORMANCE</p>																					
<table border="1"> <thead> <tr> <th>Test item</th> <th>Test condition</th> <th>Requirements</th> </tr> </thead> <tbody> <tr> <td>Examination of product</td> <td>• Visual inspection</td> <td>• No physical damage</td> </tr> <tr> <td>Low Level Contact Resistance</td> <td>• EIA-364-23 • Mate connectors: apply a current of 10mA(Max) at open circuit voltage of 20mV voltage(Max)</td> <td>• Initial 55mΩ Max. • Final Δ LLCR =20mΩ Max.</td> </tr> <tr> <td>Insulation resistance</td> <td>• Applying 500VDC for one minute between adjacent contacts of unmated connectors EIA-364-21</td> <td>• 500MΩ Min.</td> </tr> <tr> <td>Dielectric withstanding voltage</td> <td>• Measured by applying 300V/AC for one minute between adjacent contacts of unmated connector assemblies. EIA-364-20</td> <td>• No breakdown or flash • Current leakage: 0.5 mA</td> </tr> <tr> <td>Temperature rise versus current</td> <td>• The temperature rise above ambient shall not exceed 30℃ .the ambient condition is still air at 25℃ . EIA-364-70 Method 2</td> <td>• No physical damage • Δ T=30℃ Max.</td> </tr> </tbody> </table>				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 20mV voltage(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.
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<p>LOTES CO., LTD</p>		<p>PRODUCT NAME:</p> <p>M.2 CONNECTOR</p>																			
		<p>DOCUMENT No:</p> <p>SP-APCI0018</p>	<p>REV:</p> <p>1B</p>	<p>PAGE:</p> <p>1 OF 5</p>																	
		<p>APPROVED BY:</p> <p>Barney</p>	<p>CHECKED BY:</p> <p>Vito</p>	<p>WRITTEN BY:</p> <p>TAN ZHI WU</p>																	

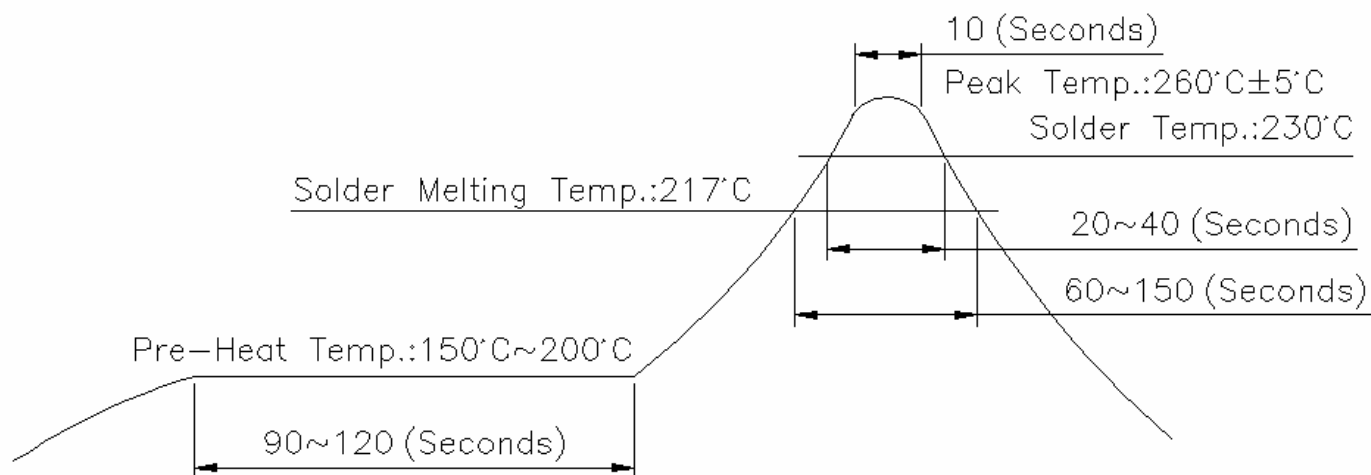
PRODUCT SPECIFICATION		REV	ECN No.
		1B	SN14***
MECHANICAL PERFORMANCE			
Test item	Test condition	Requirements	
Vibration test	<ul style="list-style-type: none">EIA-364-28, test condition VII, test condition letter D(15 minutes in each of 3 mutually perpendicular directions . Both mating halves should 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)	<ul style="list-style-type: none">No electrical discontinuity greater than 1 microsecond.△LLCR=20mΩ Max.(Final)	
Mechanical shock	<ul style="list-style-type: none">250 G (Ultra-book) and 285 G (Tablet) at 2m Sec half sine on all six axis	<ul style="list-style-type: none">No electrical discontinuity greater than 1 microsecond△ LLCR=20mΩ Max.(Final)No physical damage	
Insertion/Removal Force	<ul style="list-style-type: none">Insertion Force-20 N (2.04 kgf) Max. Removal Force-Typical 20 N, 25 N (2.55 kgf) Max. EIA-364-13	<ul style="list-style-type: none">No evidence of physical damage	
Durability (precondition)	<ul style="list-style-type: none">EIA-364-09Perform 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;	<ul style="list-style-type: none">No evidence of physical damage	
Durability	<ul style="list-style-type: none">Option1:Repeat insertion the Card to the connector and extraction Card from the connector for 25 cycles(Au:30u”Max).Option2:Repeat insertion the Card to the connector and extraction Card from the connector for 60 cycles(Au:30u”Min).EIA-364-09	<ul style="list-style-type: none">△LLCR=20mΩ Max.(Final)	
Reseating	<ul style="list-style-type: none">Manually unplug/plug the connector or socket perform 3 cycles	<ul style="list-style-type: none">No evidence of physical damage	
LOTES CO., LTD		TITLE:	
		M.2 CONNECTOR	
		DOCUMENT No:	REV:
		SP-APCI0018	1B
		PAGE:	
		2 OF 5	
APPROVED BY:		CHECKED BY:	WRITTEN BY:
Barney		Vito	TAN ZHI WU

PRODUCT SPECIFICATION		REV	ECN No.
		1B	SN14***
ENVIRONMENTAL PERFORMANCE			
Test item	Test condition	Requirements	
Cyclic temperature & Humidity	<ul style="list-style-type: none"> 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.) EIA-364-31 	<ul style="list-style-type: none"> Contact resistance: ΔLLCR=20mΩ Max. Insulation resistance: 500MΩ Min. No physical damage. 	
Thermal shock	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Contact resistance: ΔLLCR=20mΩ Max.(Final) No physical damage. 	
Salt spray	<ul style="list-style-type: none"> Subject the connector to 5% salt-solution concentration at 35°C for 48 hours. 	<ul style="list-style-type: none"> Contact resistance: ΔLLCR=20mΩ Max.(Final) No physical damage. 	
Temperature life	<ul style="list-style-type: none"> Mate PCB module and subject to 105±2°C for 120 hours EIA-364-17 	<ul style="list-style-type: none"> Contact resistance: ΔLLCR=20mΩ Max.(Final) No physical damage. 	
Temperature life (preconditioning)	<ul style="list-style-type: none"> Mate PCB module and subject to 105±2°C for 72 hours EIA 364-17 method A, using table 9 for reference 	<ul style="list-style-type: none"> Contact resistance: ΔLLCR=20mΩ Max.(Final) No physical damage. 	
Resistance to Reflow Soldering Heat	<ul style="list-style-type: none"> Test connector on PCB Heat : 210°C 260+5°C/-0°C, 10+/-1s Pre-Heat : 100~150°C Heat Peak : 	<ul style="list-style-type: none"> No physical damage 	
Solder ability	<ul style="list-style-type: none"> Solder Temperature : 245±5°C Solder time : 3±0.5s 	<ul style="list-style-type: none"> Wet solder coverage: 95% Min. 	
Rework temperature	<ul style="list-style-type: none"> 350°C, 3-5seconds for “solder iron-Max.”, temperature of component by rework process. 	<ul style="list-style-type: none"> No Damage 	
Mixed flowing gas	<ul style="list-style-type: none"> EIA-364-65, Environmental Class – IIA 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. 	<ul style="list-style-type: none"> No discontinuations of microsecond or longer duration Contact resistance: ΔLLCR=20mΩ Max. (Final) 	
Thermal disturbance	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> No evidence of physical damage Contact resistance: ΔLLCR=20mΩ Max. (Final) 	
<div> <div>LOTES CO., LTD</div> </div>		TITLE:	
		M.2 CONNECTOR	
		DOCUMENT No: SP-APCI0018	REV: 1B
		PAGE: 3 OF 5	
		APPROVED BY: Barney	CHECKED BY: Vito
		WRITTEN BY: TAN ZHI WU	

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

LOTES RECOMMENDED LEAD FREE SMT TEMPERATURE PROFILE

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

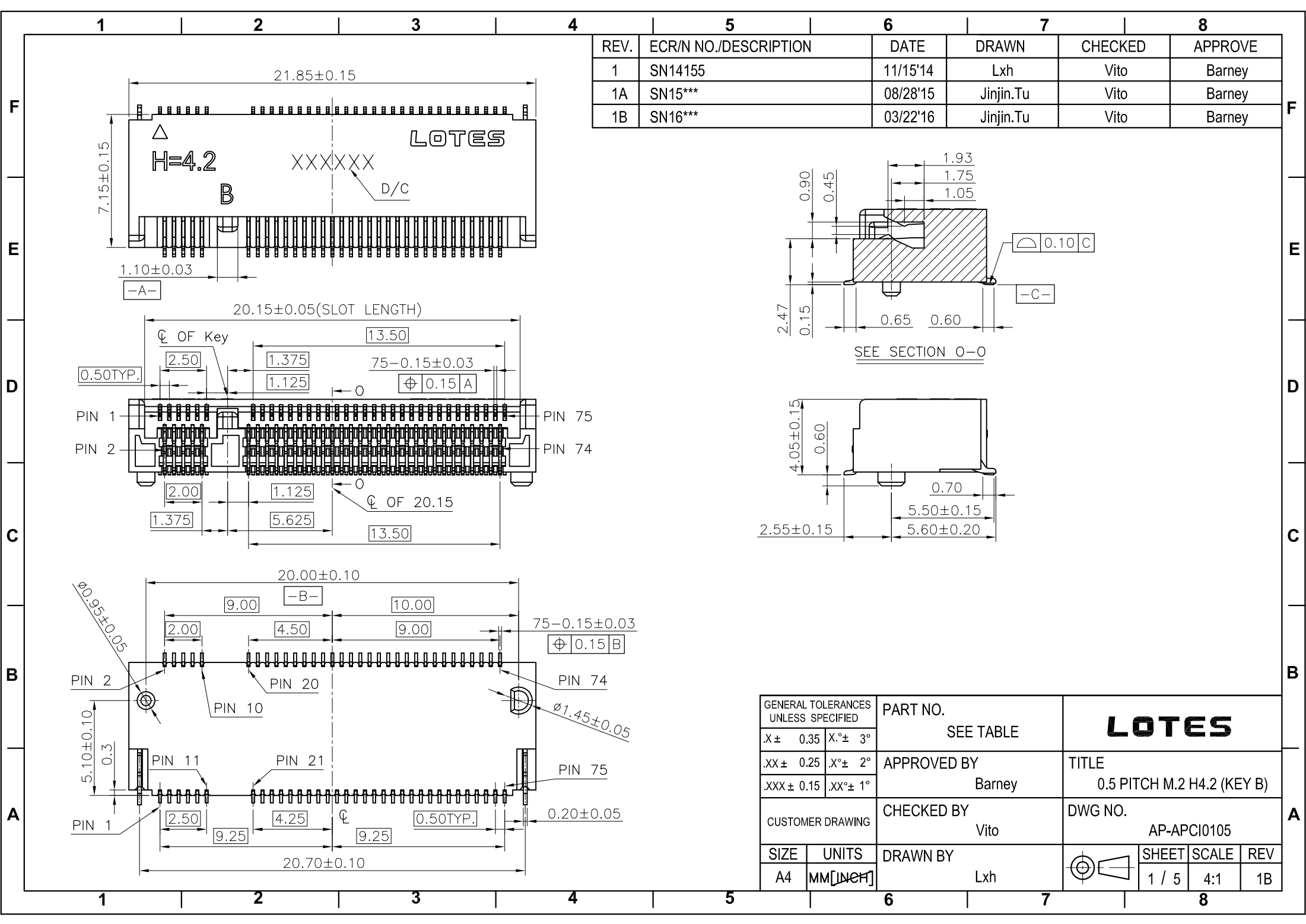


PACKAGE

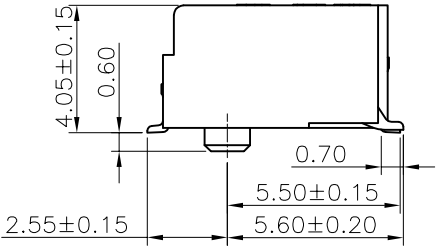
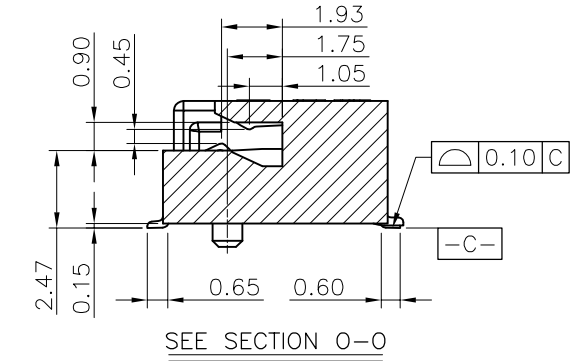
All parts shall be packaged and packed to protect against physical damage, corrosion and deterioration during shipment and storage.

LOTES CO., LTD	PRODUCT NAME: M.2 CONNECTOR		
	DOCUMENT No: SP-APCI0018	REV: 1B	PAGE: 4 OF 5
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Test conditions The tests shall be carried out under the conditions as the referring.0 (1).Temperature:15~35℃. (2).Humidity: 45~75%																																																																																																																																																	
Test Sequence: <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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REV.	ECR/N NO./DESCRIPTION	DATE	DRAWN	CHECKED	APPROVE
1	SN14155	11/15'14	Lxh	Vito	Barney
1A	SN15***	08/28'15	Jinjin.Tu	Vito	Barney
1B	SN16***	03/22'16	Jinjin.Tu	Vito	Barney



GENERAL TOLERANCES UNLESS SPECIFIED		PART NO.	LOTES		
.X± 0.35	X.°± 3°	SEE TABLE	TITLE		
.XX± 0.25	X.°± 2°	APPROVED BY	0.5 PITCH M.2 H4.2 (KEY B)		
.XXX± 0.15	.XX°± 1°	Barney	DWG NO.		
CUSTOMER DRAWING		CHECKED BY	AP-APCI0105		
Vito		DRAWN BY		SHEET	
Lxh		1 / 5		SCALE	REV
A4		MM[INCH]		4:1	1B

Notes:

1. MATERIAL SPECIFICATION:

- 1.1. HOUSING:LCP+40%GF,UL94V-0,COLOR:BLACK.
1.2. CONTACT:COPPER ALLOY C1065.
1.3. PEG:STEEL.

2. PLATING SPECIFICATION:

- 2.1. CONTACT:50u" MIN.NICKEL UNDER PLATING
OVER ALL.PLATING ON SOLDER AREA:SEE TABLE
GOLD PLATING ON CONTACT AREA:SEE TABLE
2.2. PEG:50u" MIN. NICKEL UNDER PLATING OVER ALL.
80u" MIN. MATTE TIN PLATING ON SOLDER AREA.

3. HF COMPLIANT, RoHS COMPLIANT.

4. DATE CODE: XX XX XX

DAY
WEEK
YEAR

5. MECHANICAL PERFORMANCE:

- 5.1. DURABILITY: SEE TABLE

6. ELECTRICAL PERFORMANCE:

- 6.1. CURRENT: 0.5A PER PIN.
6.2. LLCR: INITIAL 55mΩ MAX.;FINAL ΔLLCR=20mΩ MAX.

7. IR REFLOW:

THE TEMPERATURE SHALL BE 260±5°C MAINTAINING 10±1 SECONDS.

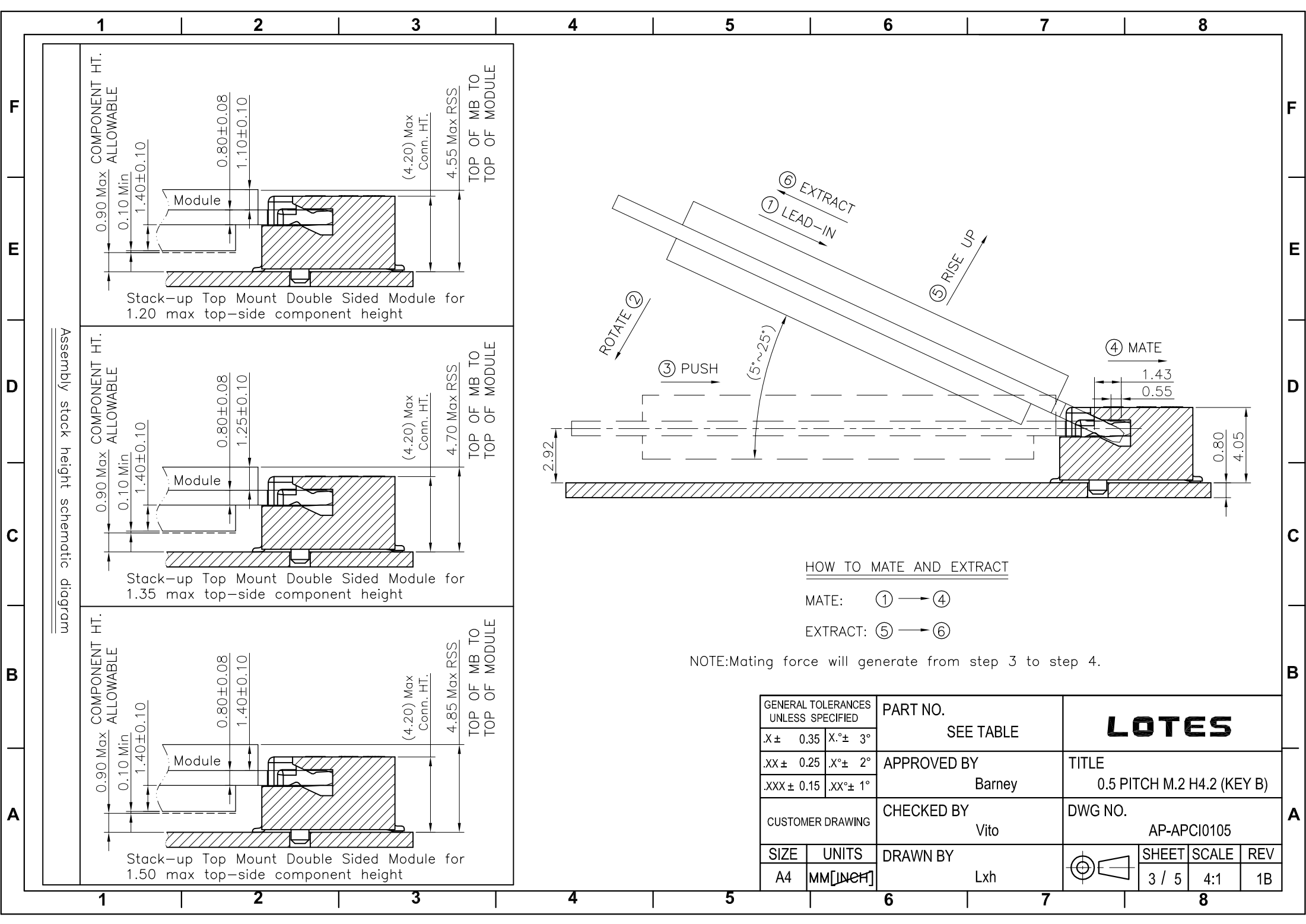
8. PRODUCT NUMBER NOTE:

APCI XXXX - XXXX

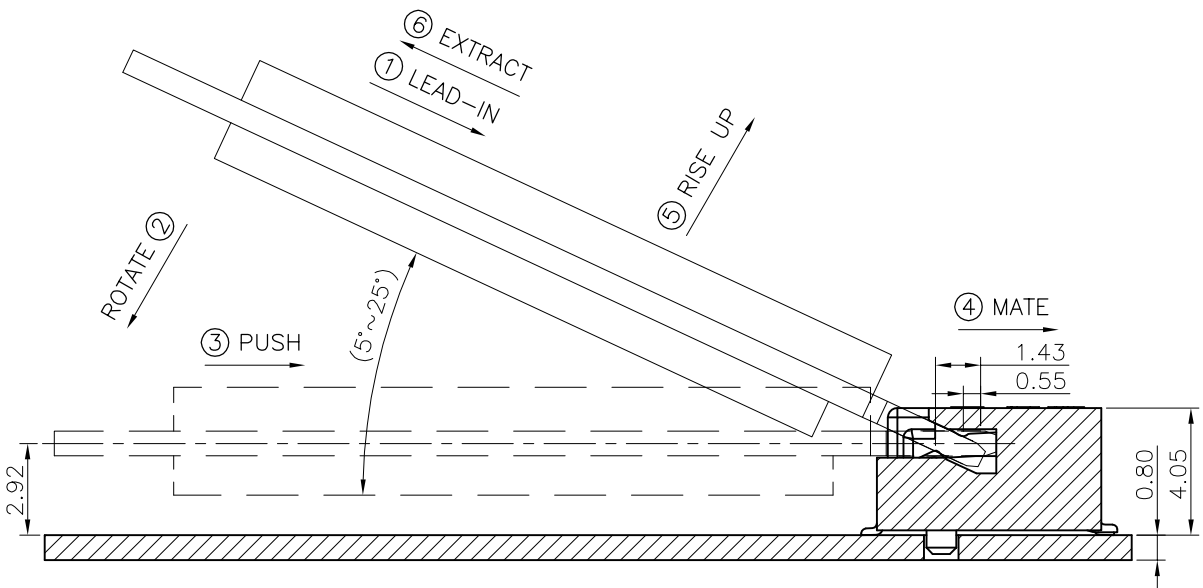
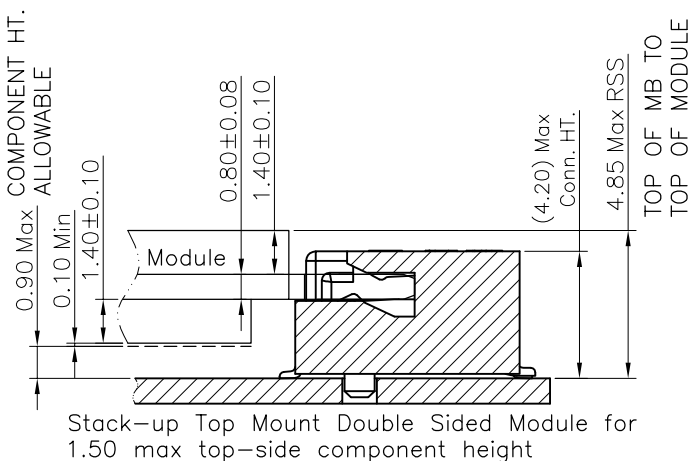
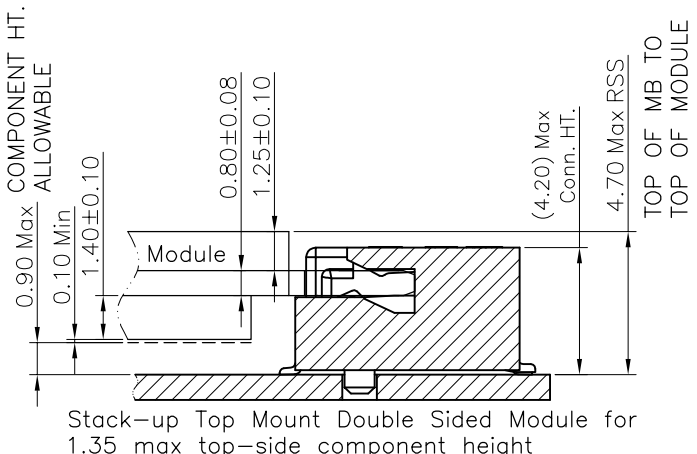
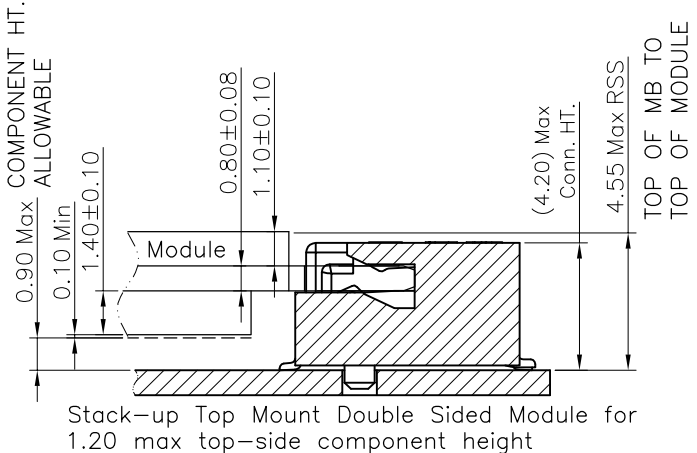
FINISHED PRODUCT

PACKING TYPE
PRODUCT SERIAL NUMBER
P:HF COMPLIANT
TYPE SERIAL NUMBER
PRODUCT TYPE

GENERAL TOLERANCES UNLESS SPECIFIED		PART NO.	LOTES			
.X ± 0.35	X° ± 3°	SEE TABLE				
.XX ± 0.25	X° ± 2°	APPROVED BY	TITLE			
.XXX ± 0.15	.XX° ± 1°	Barney	0.5 PITCH M.2 H4.2 (KEY B)			
CUSTOMER DRAWING		CHECKED BY	DWG NO.			
		Vito	AP-APCI0105			
SIZE	UNITS	DRAWN BY		SHEET	SCALE	REV
A4	MM[INCH]	Lxh		2 / 5	4:1	1B



Assembly stack height schematic diagram



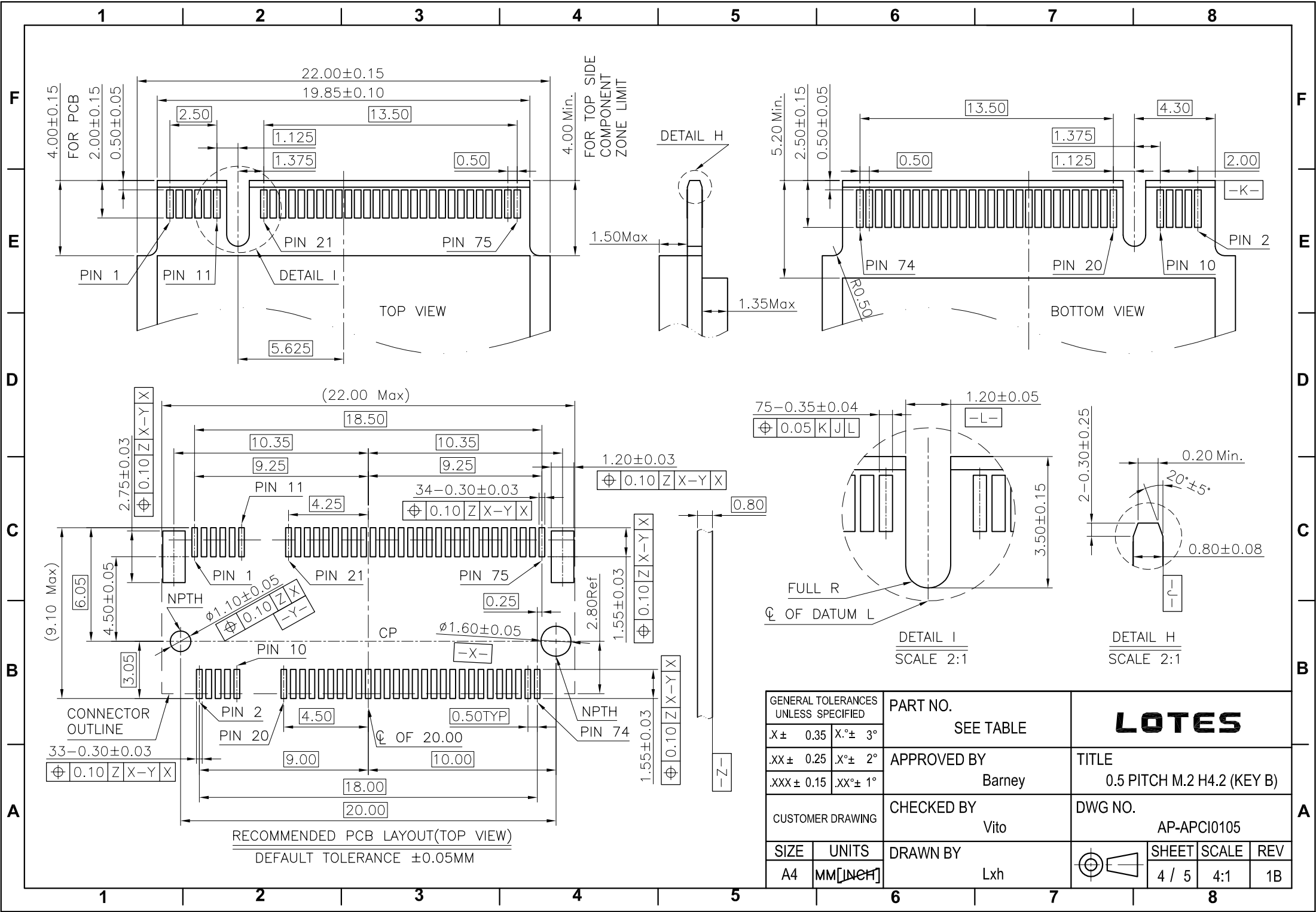
HOW TO MATE AND EXTRACT

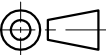
MATE: ① → ④

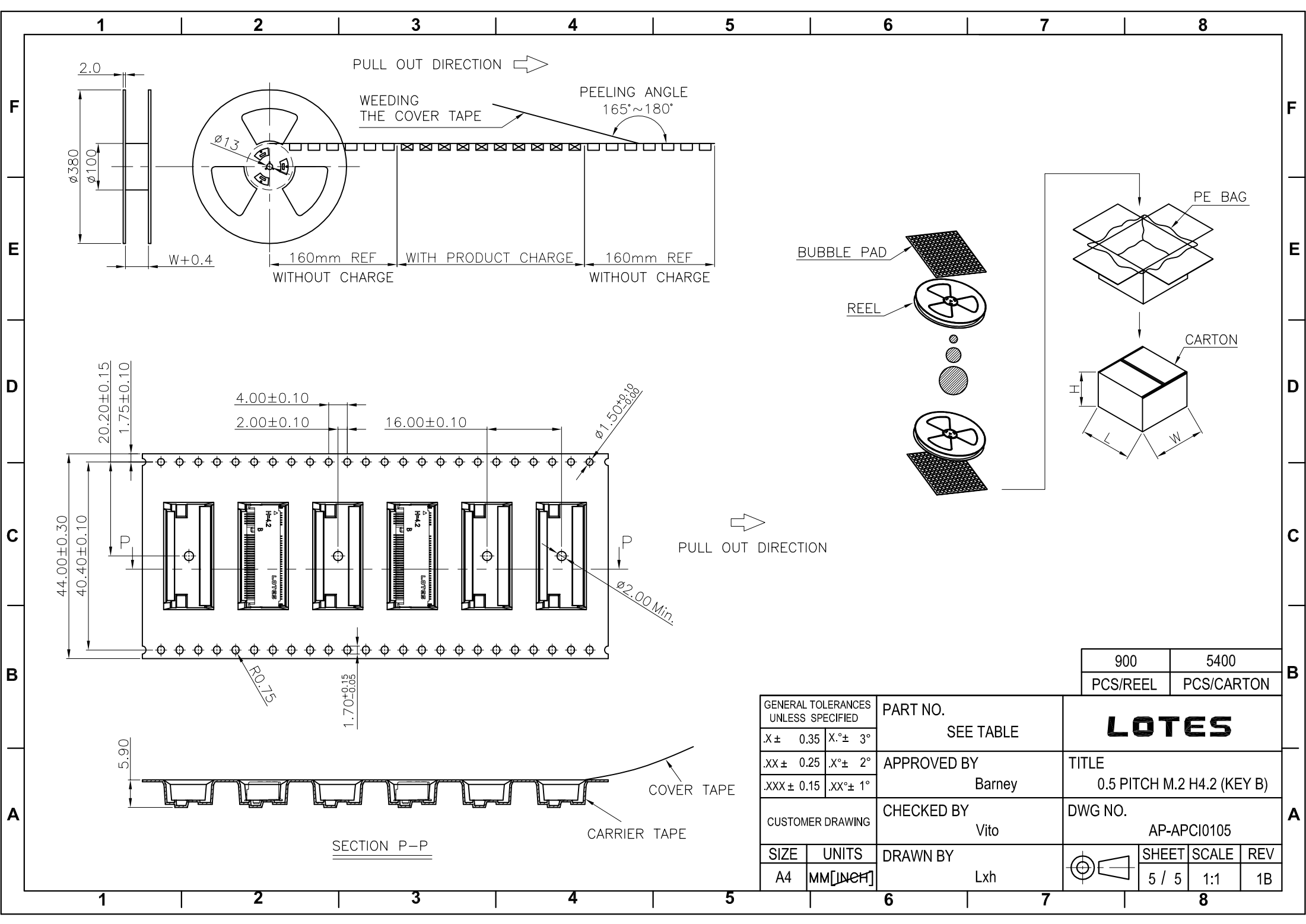
EXTRACT: ⑤ → ⑥

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

GENERAL TOLERANCES UNLESS SPECIFIED		PART NO.	LOTES		
.X± 0.35	X.°± 3°	SEE TABLE	TITLE		
.XX± 0.25	X.°± 2°	APPROVED BY	0.5 PITCH M.2 H4.2 (KEY B)		
.XXX± 0.15	.XX°± 1°	Barney	DWG NO.		
CUSTOMER DRAWING		CHECKED BY	AP-APCI0105		
Vito		DRAWN BY	SHEET SCALE REV		
Lxh		3 / 5		4:1	1B
SIZE	UNITS	DRAWN BY		SHEET	
A4	MM[INCH]	Lxh		3 / 5	SCALE
				4:1	REV

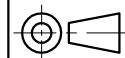


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		SEE TABLE					
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CUSTOMER DRAWING		CHECKED BY		DWG NO.			
		Vito		AP-APCI0105			
SIZE	UNITS	DRAWN BY					
A4	MM[INCH]	Lxh					
				SHEET		SCALE	REV
				4 / 5		4:1	1B



PULL OUT DIRECTION

900	5400
PCS/REEL	PCS/CARTON

GENERAL TOLERANCES UNLESS SPECIFIED		PART NO. SEE TABLE	LOTES		
.X± 0.35	X.°± 3°				
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.XXX± 0.15	.XX°± 1°				
CUSTOMER DRAWING		CHECKED BY Vito	DWG NO. AP-APCI0105		
SIZE	UNITS	DRAWN BY Lxh			
A4	MM[INCH]			SHEET	SCALE
			5 / 5	1:1	1B

PRODUCT RELIABILITY TEST REPORT

ReportNo:GL-SZ20140304-01

product:NGFF 4.2H B-Key CONNECTOR

Part NO:APCI0105-P00*A

Test Object:Product Reliability Test

Sample Quantity:40pcs

Test Environment:20~22℃;50~54%RH

Date of Test:2014-03-06~2014-05-16

Prepared By:覃庭

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	

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20140304-01**GL-P-027-005****1. Testing Sequence:**

Test or Examination		Test Group					
		A	B	C	D	E	F
1	Examination of Product	1,8	1,10	1,10	1,10	1,4	1
2	Low Level Contact Resistance	2,5,7	2,5,7,9	2,5,7,9	2,6,9		
3	Dielectric Withstanding Voltage					2	
4	Insulation Resistance					3	
5	Temperature versus current						2
6	Vibration			6			
7	Mechanical shock			8			
8	Insertion/Removal Force				3,5,8		
9	Durability (precondition)	3	3	3			
10	Durability				4,7		
11	Thermal Shock		4				
12	Cyclic temperature(Humidity)		6				
13	Reseating	6	8				
14	Temperature life	4					
15	Temperature life (Preconditioning)			4			
16	Specimen quantity (pcs)	5	5	5	5	5	5

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20140304-01

GL-P-027-005

2. Test Item & Condition & Requirements :

PROCEDURES		CONDITIONS	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 Δ LLCR =20mΩ Max.
3	Dielectric withstanding voltage	Measured by applying 300V/AC for one minute between adjacent contacts of unmated connector assemblies.	No breakdown or flash Current leakage: 0.5 mA
4	Insulation resistance	Applying 500VDC for one minute between adjacent contacts of unmated connectors EIA-364-21	500MΩ Min.
5	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.
6	Vibration test	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. Δ 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 Δ LLCR=20mΩ Max.(Final) No physical damage
8	Insertion/Removal Force	Insertion Force-20 N (2.04 kgf) Max. Removal Force-Typical 20 N, 25 N (2.55 kgf) Max. EIA-364-13	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
10	Durability	Option1: Repeat insertion the Card to the connector and extraction Card from the connector for 25 cycles(Au:30u"Max). Option2: Repeat insertion the Card to the connector and extraction Card from the connector for 60 cycles(Au:30u"Min). EIA-364-09	Δ LLCR=20mΩ Max.(Final)

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20140304-01
GL-P-027-005

PROCEDURES		CONDITIONS	REQUIREMENTS
11	Thermal shock	EIA-364-32, method A, test condition I, test duration A-4 Cold extreme : $-55^{\circ}\text{C} + 0/-5^{\circ}\text{C}$ Hot extreme : $85^{\circ}\text{C} + 3/-0^{\circ}\text{C}$ each temperature dwell 2 hour, perform 10 cycles in mated condition.	Contact resistance: $\Delta\text{LLCR} = 20\text{m}\Omega$ Max.(Final) No 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 $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ at $80\% \pm 3\% \text{RH}$ and $65^{\circ}\text{C} \pm 3^{\circ}\text{C}$ at $50\% \pm 3\% \text{RH}$. 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: $\Delta\text{LLCR} = 20\text{m}\Omega$ Max. Insulation resistance: $500\text{M}\Omega$ Min. No physical damage.
13	Reseating	• Manually unplug/plug the connector or socket perform 3 cycles	No evidence of physical damage
14	Thermal disturbance	• Cycle the mated connector between $15^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and $85^{\circ}\text{C} \pm 3^{\circ}\text{C}$, 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: $\Delta\text{LLCR} = 20\text{m}\Omega$ Max. (Final)
15	Temperature life	Mate PCB module and subject to $105 \pm 2^{\circ}\text{C}$ for 120 hours EIA-364-17	Contact resistance: $\Delta\text{LLCR} = 20\text{m}\Omega$ Max.(Final) No physical damage.
16	Temperature life (preconditioning)	Mate PCB module and subject to $105 \pm 2^{\circ}\text{C}$ for 72 hours EIA 364-17 method A, using table 9 for reference	Contact resistance: $\Delta\text{LLCR} = 20\text{m}\Omega$ Max.(Final) No physical damage.

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20140304-01**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	25. 21	27. 09	29. 35	26. 41	26. 73	mΩ	Pass
3	Durability (Preconditioning)	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Temperature Life	Normal	Normal	Normal	Normal	Normal	/	Pass
5	LLCR	27. 11	27. 18	27. 75	26. 25	28. 96	mΩ	Pass
	△LLCR	4. 32	1. 77	2. 53	2. 58	4. 86	mΩ	Pass
6	Reseating	Normal	Normal	Normal	Normal	Normal	/	Pass
7	LLCR	28. 06	28. 03	29. 67	27. 08	29. 17	mΩ	Pass
	△LLCR	5. 13	4. 11	2. 95	3. 70	4. 91	mΩ	Pass
8	Examination Of Product	Normal	Normal	Normal	Normal	Normal	/	Pass



PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20140304-01

GL-P-027-005

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	26.13	26.31	24.78	26.11	25.71	mΩ	Pass
3	Durability(Preconditioning)	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Thermal Shock	Normal	Normal	Normal	Normal	Normal	/	Pass
5	LLCR	25.92	26.19	25.99	26.70	26.31	mΩ	Pass
	△LLCR	3.36	2.91	4.25	5.56	2.21	mΩ	Pass
6	Cyclic Temp & Humidity	Normal	Normal	Normal	Normal	Normal	/	Pass
7	LLCR	25.63	25.74	25.36	27.12	25.66	mΩ	Pass
	△LLCR	3.04	2.42	3.58	5.98	1.90	mΩ	Pass
8	Reseating	Normal	Normal	Normal	Normal	Normal	/	Pass
9	LLCR	25.42	25.65	25.41	26.18	25.57	mΩ	Pass
	△LLCR	2.78	2.69	3.68	5.04	1.73	mΩ	Pass
10	Examination Of Product	Normal	Normal	Normal	Normal	Normal	/	Pass

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20140304-01**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	27. 91	30. 99	29. 37	30. 58	30. 32	mΩ	Pass
3	Durability (Preconditioning)	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Temperature Life (Preconditioning)	Normal	Normal	Normal	Normal	Normal	/	Pass
5	LLCR	29. 48	30. 38	29. 77	32. 69	28. 61	mΩ	Pass
	△LLCR	6. 55	6. 69	4. 56	4. 45	3. 45	mΩ	Pass
6	Vibration	Normal	Normal	Normal	Normal	Normal	/	Pass
7	LLCR	28. 57	29. 99	28. 13	28. 02	27. 43	mΩ	Pass
	△LLCR	5. 15	5. 45	4. 78	5. 41	3. 99	mΩ	Pass
8	Mechanical shock	Normal	Normal	Normal	Normal	Normal	/	Pass
9	LLCR	29. 40	33. 77	28. 57	30. 11	28. 20	mΩ	Pass
	△LLCR	3. 67	10. 08	3. 99	5. 32	4. 24	mΩ	Pass
10	Examination Of Product	Normal	Normal	Normal	Normal	Normal	/	Pass

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20140304-01**GL-P-027-005****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	25.32	25.67	34.55	25.87	26.90	mΩ	Pass
3	Insertion Force	0.91	0.84	0.98	0.87	0.94	Kgf	Pass
	Removal Force	0.75	0.68	0.76	0.68	0.80	Kgf	Pass
4	Durability	Normal	Normal	Normal	Normal	Normal	/	Pass
5	Insertion Force	0.84	0.76	0.75	0.88	0.81	Kgf	Pass
	Removal Force	0.77	0.63	0.69	0.71	0.73	Kgf	Pass
6	LLCR	28.22	28.83	34.51	28.81	27.93	mΩ	Pass
	△LLCR	3.88	4.16	0.14	5.09	3.56	mΩ	Pass
7	Durability	Normal	Normal	Normal	Normal	Normal	/	Pass
8	Insertion Force	0.71	0.81	0.81	0.76	0.74	Kgf	Pass
	Removal Force	0.68	0.65	0.78	0.68	0.68	Kgf	Pass
9	LLCR	32.81	31.24	34.62	29.23	28.07	mΩ	Pass
	△LLCR	7.50	8.01	0.09	5.76	3.61	mΩ	Pass
10	Examination Of Product	Normal	Normal	Normal	Normal	Normal	/	Pass

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	Dielectric Withstanding Voltage	300	300	300	300	300	Vac	Pass
3	Insulation Resistance	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Examination Of Product	Normal	Normal	Normal	Normal	Normal	/	Pass



PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20140304-01

GL-P-027-005

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	Temperature versus current	23. 11	24. 17	24. 02	25. 07	23. 94	°C	Pass

PRODUCT RELIABILITY TEST REPORT

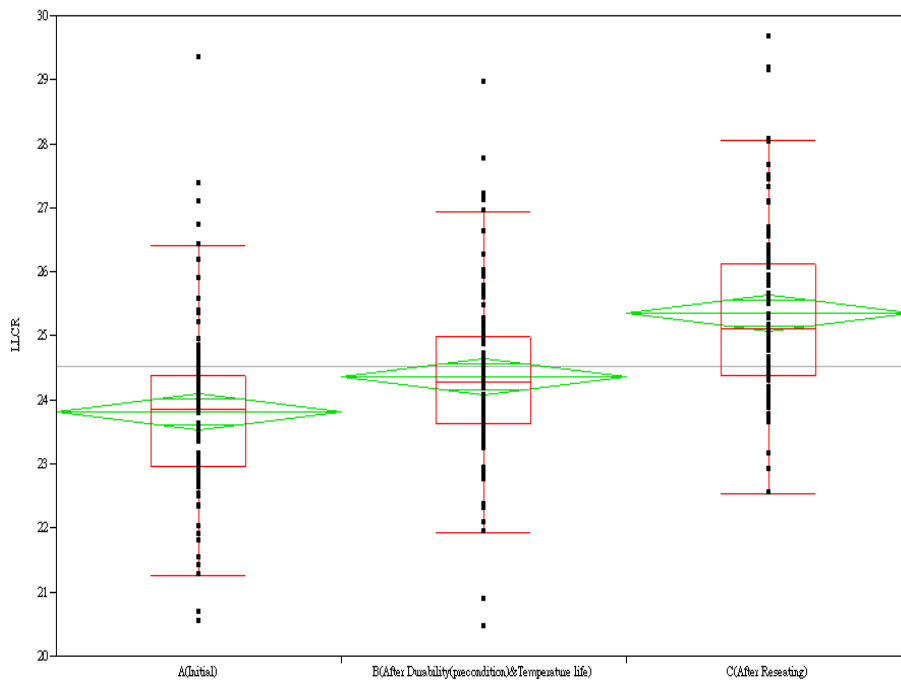
Report No. GL-SZ20140304-01

GL-P-027-005

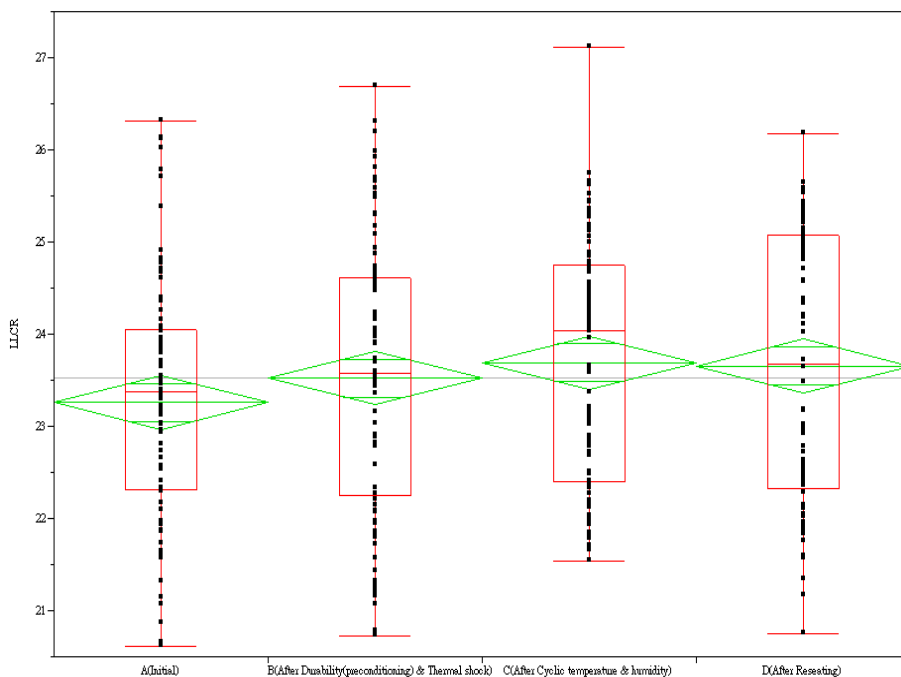
4.The LLCR Oneway analysis as follow: (Unit: $m\Omega$)



Group A:



Group B

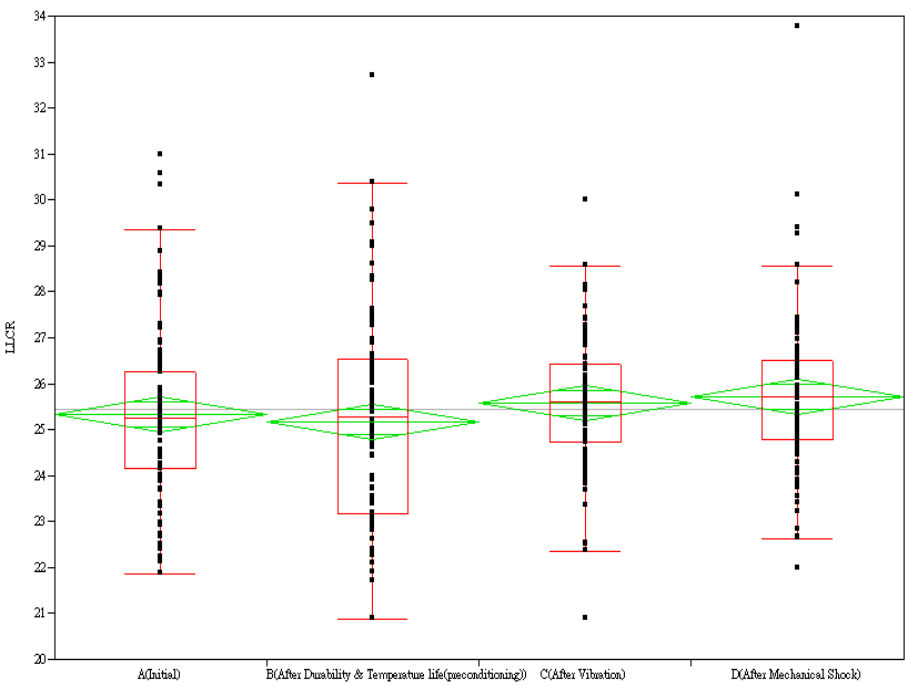


**PRODUCT RELIABILITY
TEST REPORT**

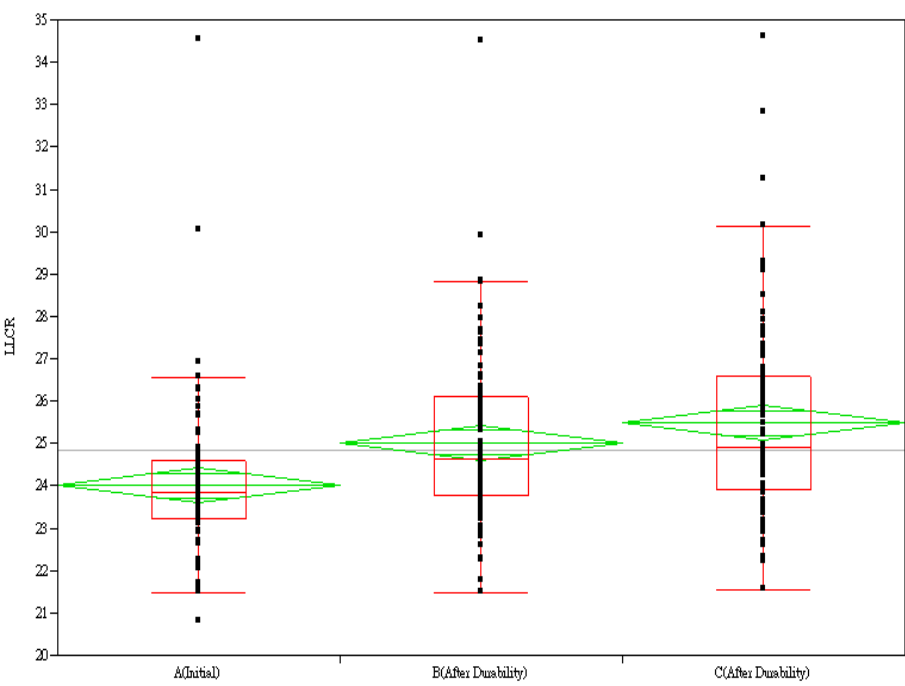
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GL-P-027-005

Group C



Group D





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 ^x 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	Value
			Tested (mm)	
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 ²	-	-
ISO Izod Impact	ISO 180	kJ/m ²	-	-
ISO Charpy Impact	ISO 179-2	kJ/m ²	-	-

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測試報告

Test Report

號碼(No.) : CE/2016/43083

日期(Date) : 2016/04/21

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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.



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 & E6807TB & SR2506B & SZ4506B & SV6808LB
 收件日期(Sample Receiving Date) : 2016/04/15
 測試期間(Testing Period) : 2016/04/15 TO 2016/04/21

測試需求(Test Requested):

- (1) 依據客戶指定，參考RoHS2011/65/EU Annex II及其修訂指令(EU) 2015/863測試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚，DBP, BBP, DEHP, DIBP. (As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample.)
- (2) 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

測試報告

Test Report

號碼(No.) : CE/2016/43083

日期(Date) : 2016/04/21

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華立企業股份有限公司

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



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), 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), 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), 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), 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 (1996), 以感應耦合電漿原子發射光譜儀檢測. / With reference to US EPA 3050B (1996). Analysis was performed by ICP-AES.	2	n. d.
三氧化二銻 / Antimony trioxide (Sb ₂ O ₃)* (CAS No.: 1309-64-4)	mg/kg	參考US EPA 3050B (1996), 以感應耦合電漿原子發射光譜儀檢測. / With reference to US EPA 3050B (1996). Analysis was performed by ICP-AES.***	-	n. d.

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測試報告

Test Report

號碼(No.) : CE/2016/43083

日期(Date) : 2016/04/21

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



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 (α -HBCDD, β -HBCDD, γ -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), 以氣相層析/質譜儀檢測。 / With reference to IEC 62321 (2008). Analysis was performed by GC/MS.	5	n. d.
鄰苯二甲酸丁苄酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	參考IEC 62321-8/CD (2013), 以氣相層析儀/質譜儀檢測。 / With reference to IEC 62321-8/CD (2013). 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		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		50	n. d.
鄰苯二甲酸二異癸酯 / DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	mg/kg		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		50	n. d.
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg		50	n. d.
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50	n. d.
鄰苯二甲酸二戊酯 / Di-n-pentyl phthalate (CAS No.: 131-18-0)	mg/kg		50	n. d.
鄰苯二甲酸二正己酯 / DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3)	mg/kg		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		50	n. d.

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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.



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), 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), 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 62321-6 (2015), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6 (2015) 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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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.



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	268
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 results 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

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/m²。

(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/m².)

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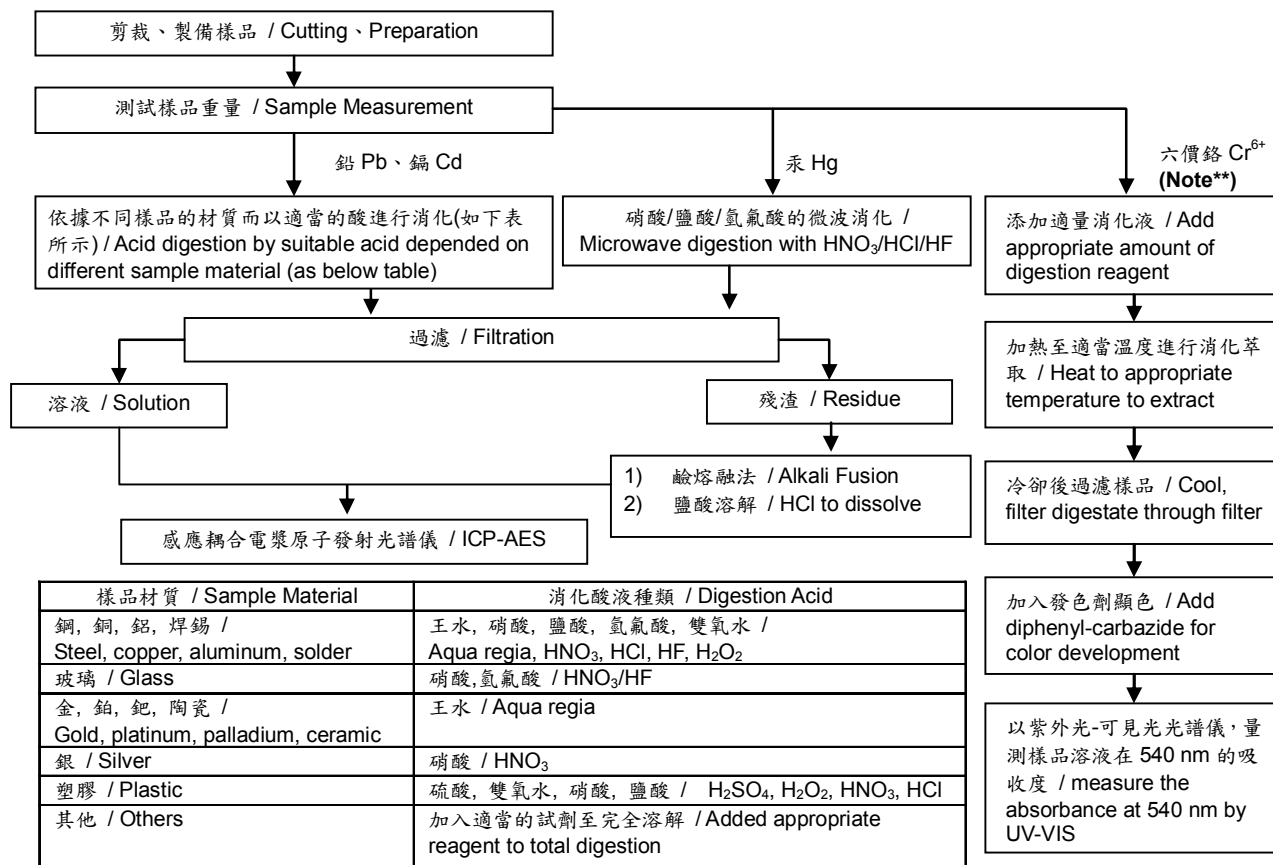
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根據以下的流程圖之條件，樣品已完全溶解。(六價鉻測試方法除外)

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)

- 測試人員：楊登偉 / Technician : Climbgreat Yang
- 測試負責人：張啟興 / Supervisor: 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.

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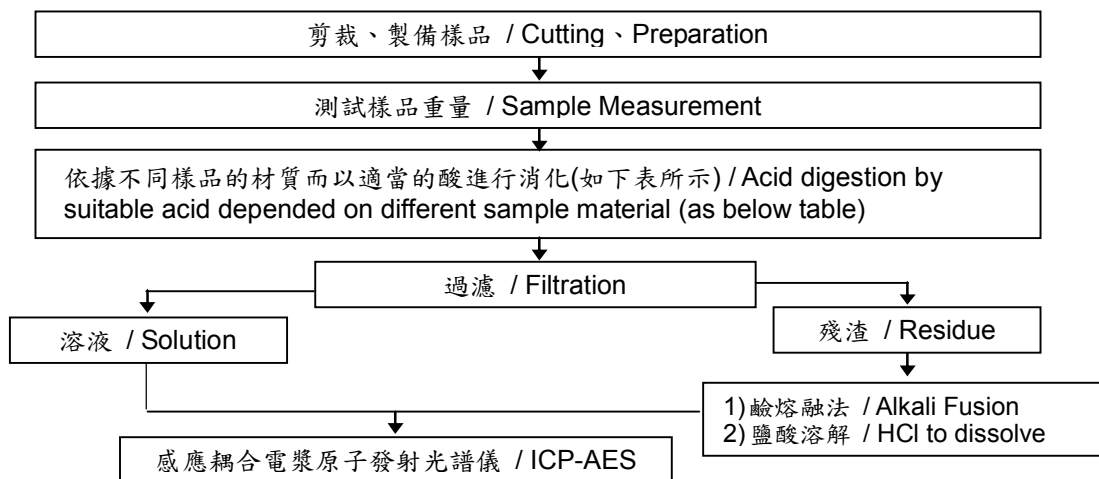
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根據以下的流程圖之條件，樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.

- 測試人員：楊登偉 / Technician: Climbgreat Yang
- 測試負責人：張啟興 / Supervisor: 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)



鋼,銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氟酸,雙氧水 / Aqua regia, HNO ₃ , HCl, HF, H ₂ O ₂
玻璃 / Glass	硝酸,氫氟酸 / HNO ₃ /HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO ₃
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , 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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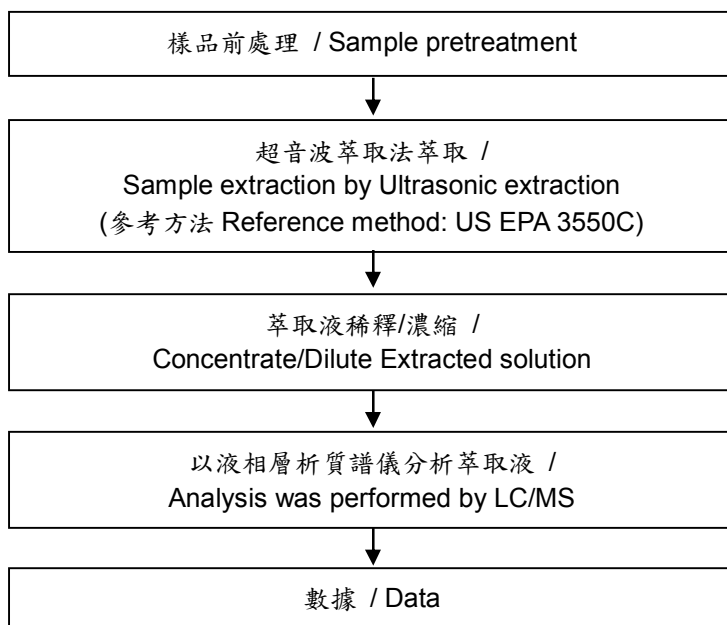
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全氟辛酸/全氟辛烷磺酸分析流程圖 / Analytical flow chart - PFOA/PFOS

- 測試人員：翁賜彬 / Technician: Roman Wong
- 測試負責人：張啟興 / Supervisor: Troy Chang



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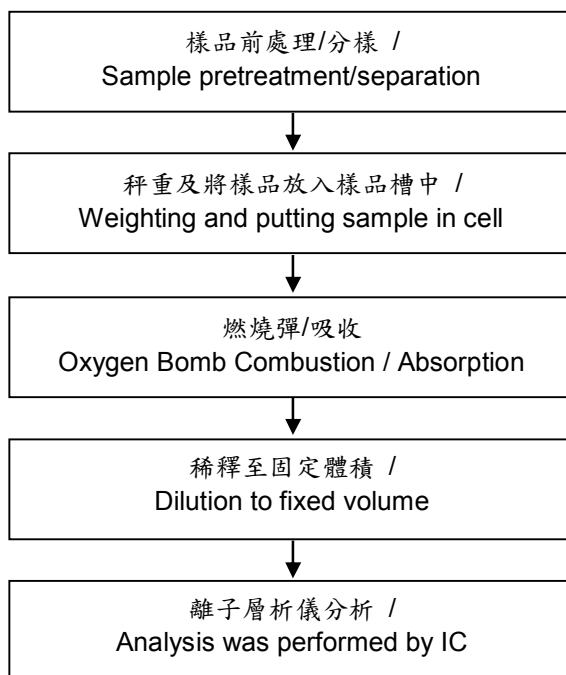
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鹵素分析流程圖 / Analytical flow chart - Halogen

- 測試人員：陳恩臻 / Technician: Rita Chen
- 測試負責人：張啟興 / Supervisor: Troy Chang



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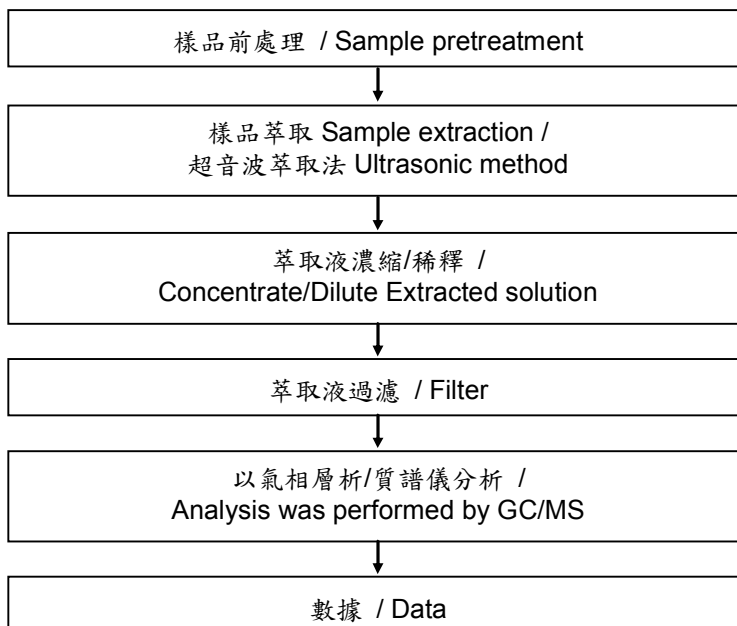
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六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD

- 測試人員：翁賜彬 / Technician: Roman Wong
- 測試負責人：張啟興 / Supervisor: Troy Chang



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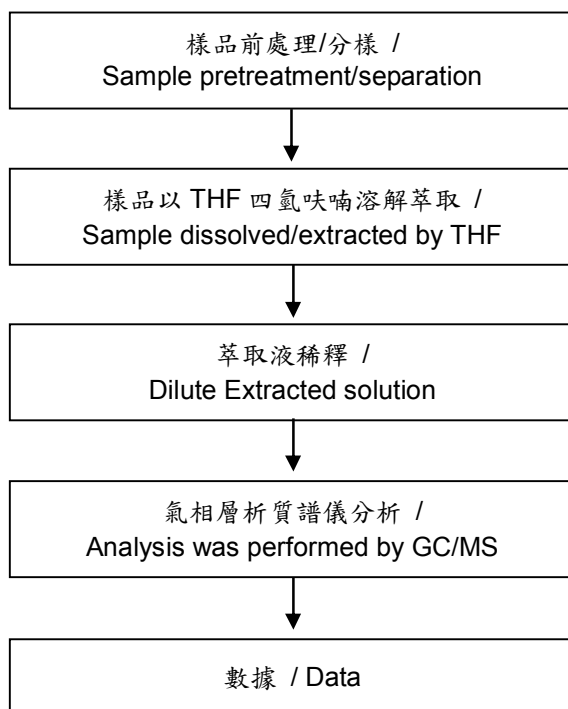
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可塑劑分析流程圖 / Analytical flow chart - Phthalate

- 測試人員：徐毓明 / Technician: Andy Shu
- 測試負責人：張啟興 / Supervisor nt: Troy Chang

【測試方法/Test method: IEC 62321-8】



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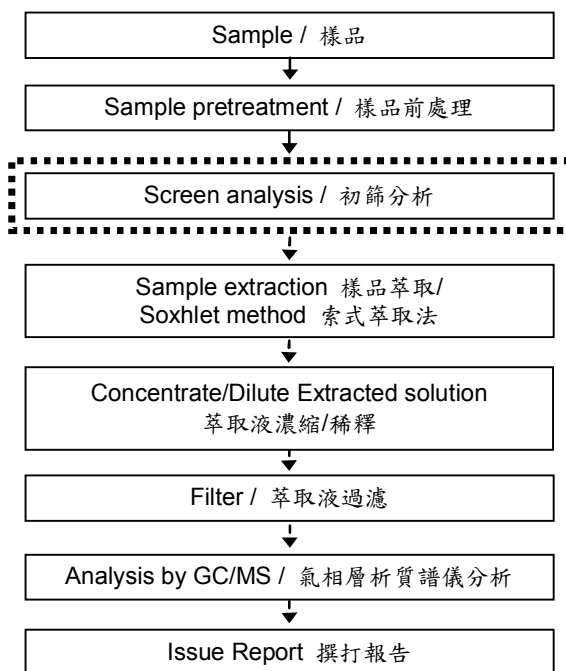
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多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBB/PBDE

- 測試人員：翁賜彬 / Technician: Roman Wong
- 測試負責人：張啟興 / Supervisor: 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 - - ->



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* 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/2016/43083



** 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
Specified values:		64,5 / 66,5	33,5 / 35,5
Actual values:	214524	65,7 / 66,0	Remainder

DIMENSIONAL REQUIREMENTS

	Coil	Thickness min/max mm	x	s	n	Width min/max mm
Specified values:		0,143 / 0,157				304,85 / 305,15
Actual values:	214524	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
Specified values:		180 / 210	565 / 635
Actual values:	214524	194 / 195	635 / 635

All properties stated on this document are according to your specifications

This document is generated automatically and therefore not signed.

Test Report

Report No. ECL01H000828001R1

Page 1 of 4

Applicant LOTES SUZHOU CO.,LTD

Address NO.26 CAOJU AVENUE XIANGCHENG ECONOMY DEVELOPMENT ZONE

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. SM1065/7
Color Yellow
Buyer LOTES Suzhou CO.,LTD
Supplier Aurubis Netherlands BV
Sample Received Date Jan. 6, 2016
Testing Period Jan. 6, 2016 to Jan. 9, 2016

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

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 62321-7-1:2015	UV-Vis

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

Tested by Ada
Approved by Su Hongwei
Senior Laboratory Manager
Centre Testing International Pinbiao (Shanghai) Co., Ltd.

Reviewed by

Hu Hongwei

Date

Jan. 12, 2016

No. R229256700

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

Test Report

Report No. ECL01I000828001R1

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Test Result(s)

Tested Item(s)	Result	MDL
Lead (Pb)	16 mg/kg	2 mg/kg
Cadmium (Cd)	5 mg/kg	2 mg/kg
Mercury (Hg)	N.D.	2 mg/kg
Hexavalent Chromium(Cr(VI))	N.D. (Negative)	0.02 µg/cm ²

Tested Sample/Part Description Golden metal

Remark: 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 Cr(VI) concentration detected in the boiling water extraction solution is less than 0.10µg/cm²

Note: This testing report displaces the original report of No. ECL01I000828001, and the original one No. ECL01I000828001 was invalid since the date of this testing report released.

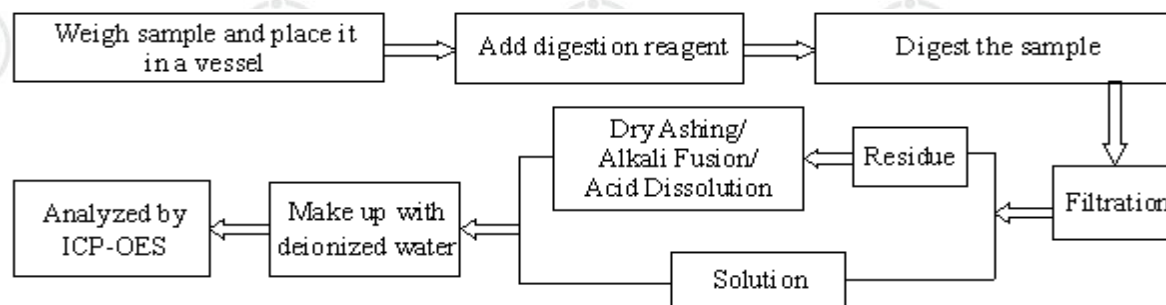
Test Report

Report No. ECL01H000828001R1

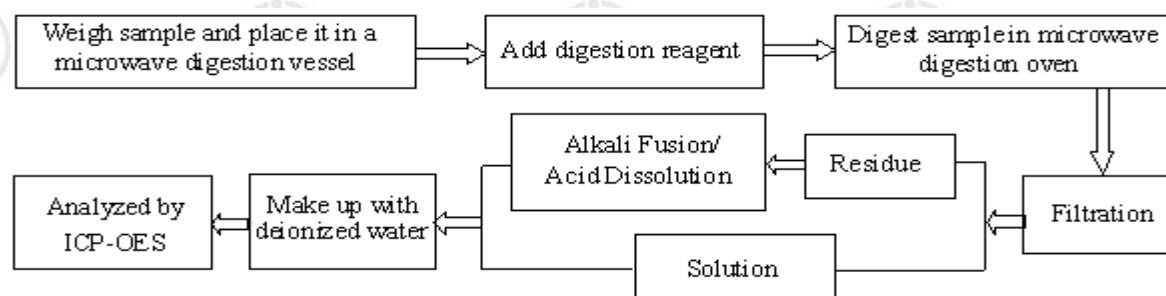
Page 3 of 4

Test Process

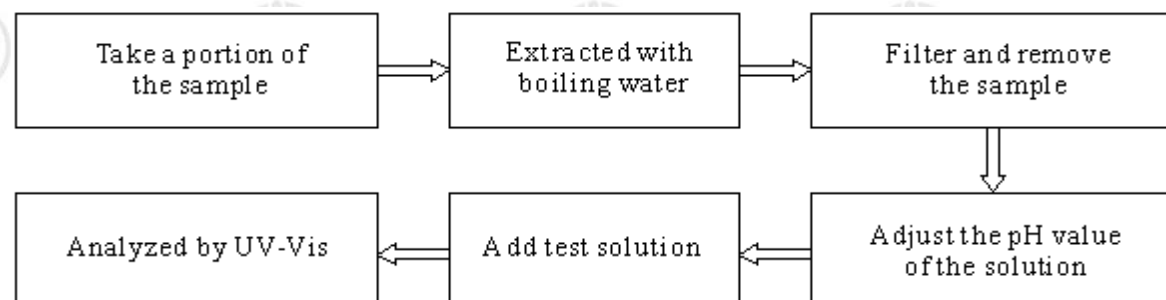
1. Lead (Pb), Cadmium (Cd)



2. Mercury (Hg)



3. Hexavalent Chromium(Cr(VI))

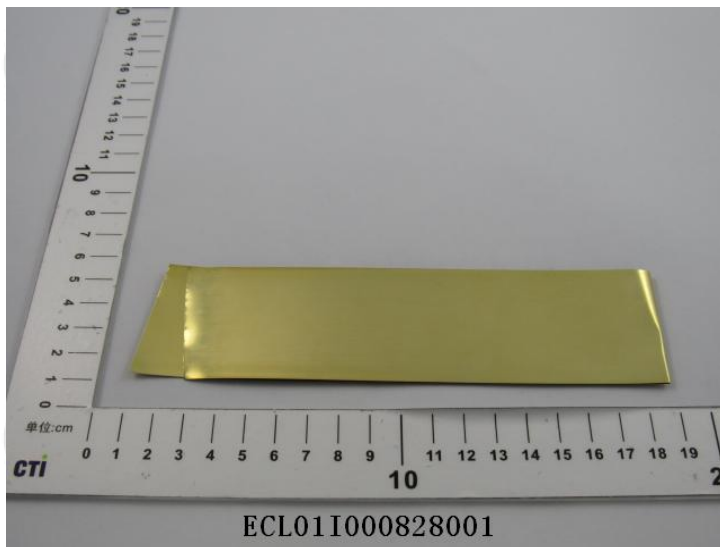


Test Report

Report No. ECL01I000828001R1

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Photo(s) of the sample(s)



*** End of report ***

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材 質 證 明 書

昆山瑞华达精密电子材料有限公司

MATERIAL CERTIFICATE

昆山市张浦镇振新西路 300 号

Kunshan Ruihuada Precision Electronic Material Co., Ltd.

TEL : 0512-57299581 FAX : 0512-36603722

製造編號		得意								生產編號 Customer No			20110825002		開立日期 Issue Date		2011-8-25		證明書編號 Certificate No		20110825002	
鋼種名稱		S50C								訂單編號 Order No					依據規範 By Standard		JIS					
專案 Item	鋼卷編號 Coil No		厚度 (MM) Thickness		寬度 (MM) Width		長度 (MM) Length		數量 Quantity		重量 (KG) Weight		成品表面加工 Surface Finish									
1			0.4		26		COIL COIL COIL COIL COIL		1C		样品											
2																						
3																						
4																						
5																						
規格	化學 (Chemical Analysis Wtx%)										規格 Spec	硬度 Hardness	降伏強度 (N/mm ²) Yieldstress	引張強度 (N/mm ²) Tensile Stress	伸長率 (%) Elongation	彎曲試驗 BendTest						
Spec	C	Si	Mn	P	S	Ni	Cr	Mo	N													
專案 Item	0.47 0.53	0.15 0.35	0.60 0.90	0.030 max.	0.035 max.						試片編號 Specimen	HV	min	min	min	min						
1	0.48	0.25	0.74	0.022	0.003						20110825002	170					OK					
2																						
3																						
4																						
5																						
以上所列出的典型資料，僅供參考，並不代表技術資料的最大或最小值，也不用於最終設計。任一具體材料的資料可能與此表中所列出的資料有所不同。 Data shown are typical,For reference only,and should not be construed as maximum or minimum values for specification or for final .Data on any particular piece of material may vary from those shown heren.													如有異常，請於三天內回復。 Only discrepancy pls contact us within3day`s.					技術部經理 Mamger ,Technology Department				

Test Report

No. SHAEC1614613901

Date: 06 Jul 2016

Page 1 of 4

Kunshan Ruihuada Precision Electronic Material Co., Ltd
Vibration, ZhangPu town, Kunshan City West Road No.889

The following sample(s) was/were submitted and identified on behalf of the clients as : S50C

SGS Job No. : SP16-024362 - SH
Model No. : S50C
Date of Sample Received : 04 Jul 2016
Testing Period : 04 Jul 2016 - 06 Jul 2016
Test Requested : Selected test(s) as requested by client.
Test Method : Please refer to next page(s).
Test Results : Please refer to next page(s).
Conclusion : Based on the performed tests on submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Marry Ma

Marry Ma
Approved Signatory



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SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing Center-Chenchen Laboratory

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t HL (86-21) 61402594 f HL (86-21) 61156899 e sgs.china@sgs.com

Test Report

No. SHAEC1614613901

Date: 06 Jul 2016

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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA16-146139.001	Silvery metal

Remarks :

- (1) 1 mg/kg = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected (< MDL)
- (4) "-" = Not Regulated

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method : (1) With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.
 (2) With reference to IEC 62321-5:2013, determination of Lead by AAS.
 (3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.
 (4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by spot test / Colorimetric Method using UV-Vis.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	-	-	◇	Negative

Notes :

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
- (2) ◇Spot-test:
 Negative = Absence of Cr(VI) coating, Positive = Presence of Cr(VI) coating;
 (The tested sample should be further verified by boiling-water-extraction method if the spot test result is Negative or cannot be confirmed.)
 ◇Boiling-water-extraction:
 Negative = Absence of Cr(VI) coating
 Positive = Presence of Cr(VI) coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.
 Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.



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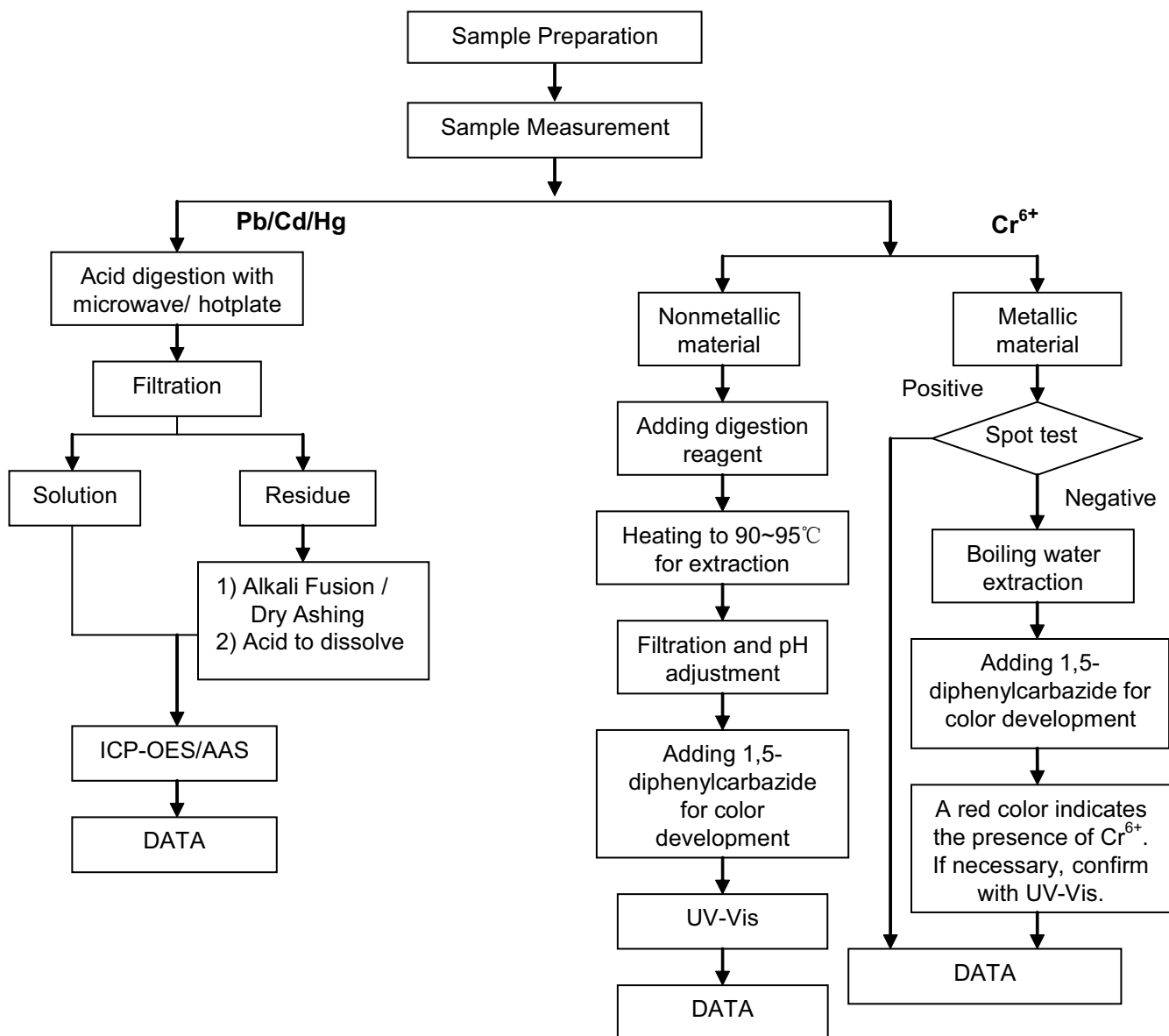
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ATTACHMENTS

RoHS Testing Flow Chart

- 1) Name of the person who made testing: Bob Zhang/Jing Zhang/Shimin Zhang
- 2) Name of the person in charge of testing: Luna Xu/Jan Shi/Stone Chen
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart.
(Cr⁶⁺ test method excluded)



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Test Report

No. SHAEC1614613901

Date: 06 Jul 2016

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Sample photo:



SGS authenticate the photo on original report only

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Testing Center-Chemical Laboratory

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检测报告 Test Report

报告编号 ECL01I062655002E
Report No. ECL01I062655002E

第 1 页 共 6 页
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 CAOJU 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 鍍Ni Au
Sample Name

材料名称 C1065
Material

样品接收日期 2016.10.24
Sample Received Date Oct. 24, 2016

样品检测日期 2016.10.24-2016.10.27
Testing Period Oct. 24, 2016 to Oct. 27, 2016

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 陈娟娟
Tested by

批准 林红伟
Approved by

林红伟
Senior Laboratory Manager

审 核 陶英
Reviewed by

日 期 2016.10.27
Date

上海华测品标检测技术有限公司
Centre Testing International Pinbiao(Shanghai) Co., Ltd.

No. R264041685
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 ECL01I062655002E
Report No. ECL01I062655002E

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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 62321-7-1:2015	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)	60 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))	N.D. ▼	0.10 µg/cm ² (LOQ)
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 ²

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Report No. ECL01I062655002E

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测试样品/部位描述 银色镀层
Tested Sample/Part Description Silvery plating

备注: 对于检测铅, 镉, 汞之样品已完全溶解。
-N.D. = 未检出 (小于方法检出限或定量限)
-mg/kg = ppm = 百万分之一
-LOQ = 定量限, 六价铬的定量限为0.10 µg/cm²
-▼六价铬浓度小于0.10 µg/cm², 样品未检出六价铬。

Remark: **The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.**
-MDL = Method Detection Limit
-N.D. = Not Detected (<MDL or LOQ)
-mg/kg = ppm = parts per million
-LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 µg/cm²
-▼The sample is negative for Cr(VI) – The Cr(VI) concentration is below 0.10 µg/cm². The coating is considered a non-Cr(VI) based coating.

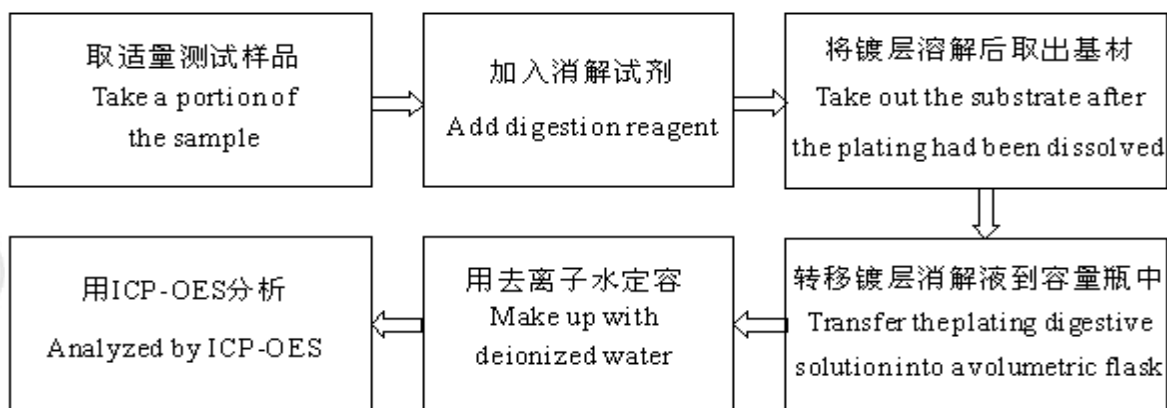
检测报告 Test Report

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Report No. ECL01H062655002E

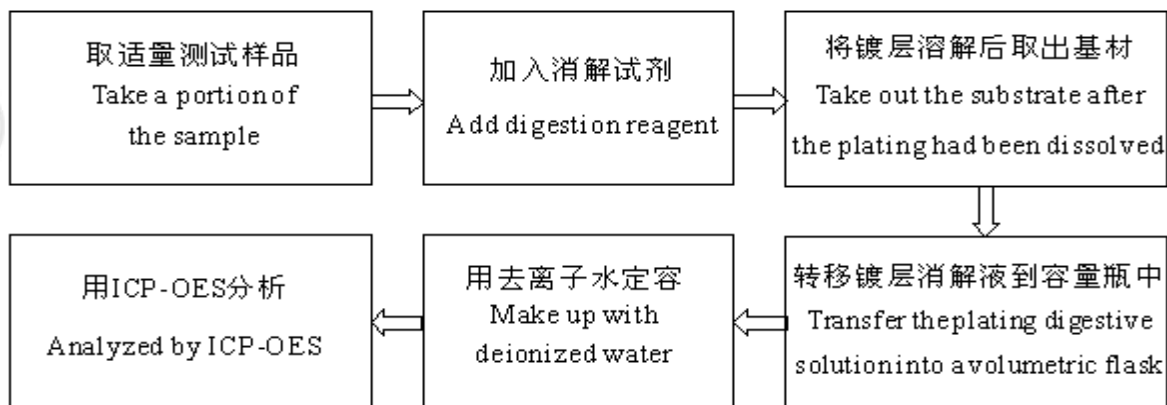
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检测流程 Test Process

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



2. 汞(Hg) Mercury (Hg)

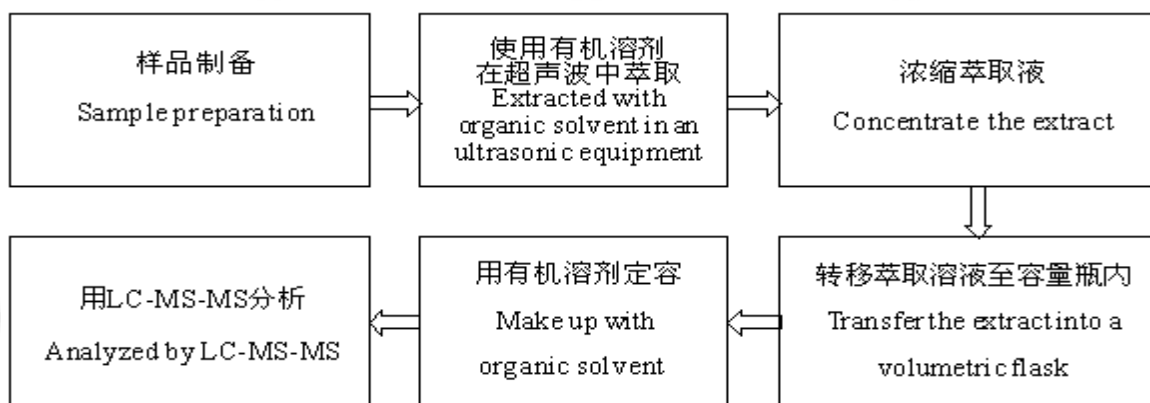


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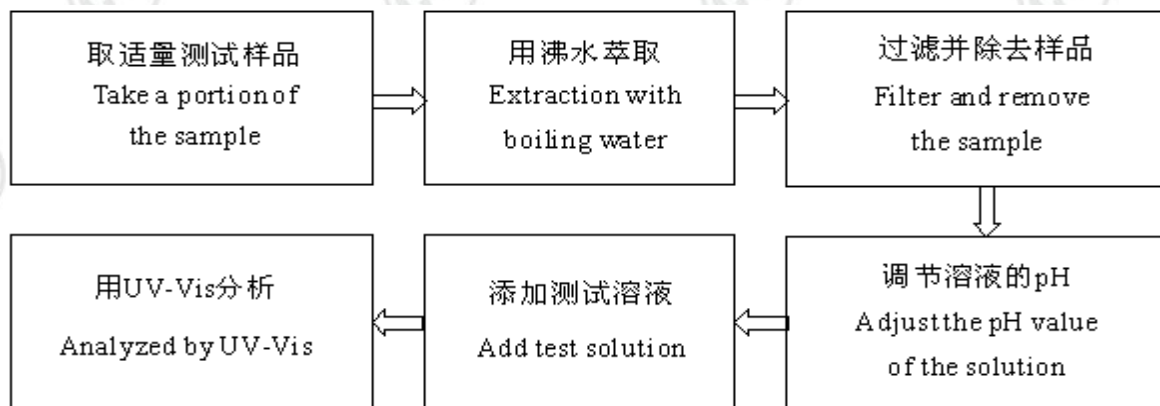
报告编号 ECL01H062655002E
Report No. ECL01H062655002E

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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))

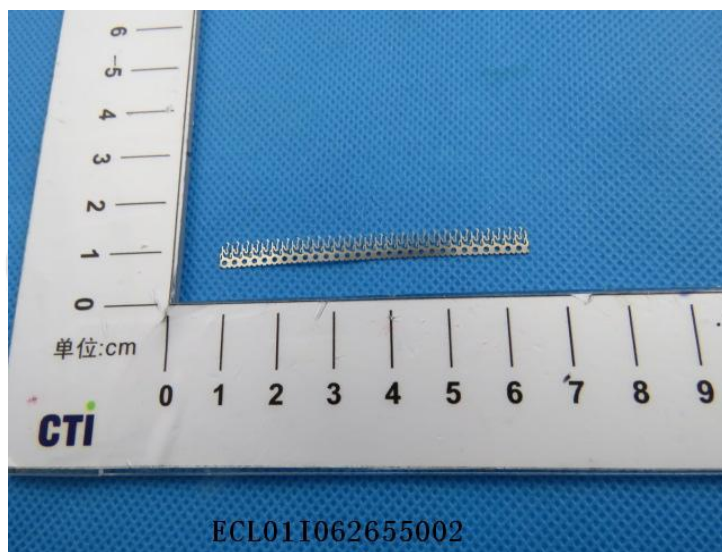


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样品图片 Photo(s) of the sample(s)



报告结束
*** End of report ***

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检测报告 Test Report

报告编号 ECL01I062655001E
Report No. ECL01I062655001E

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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 CAOHU 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 鍍層Ni Sn
Sample Name

材料名称 S50C
Material

样品接收日期 2016.10.24
Sample Received Date Oct. 24, 2016

样品检测日期 2016.10.24-2016.10.27
Testing Period Oct. 24, 2016 to Oct. 27, 2016

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 陈娟娟
Tested by

批准 苏红伟
Approved by

CTI
Centre Testing International Pinbiao(Shanghai) Co., Ltd.
Senior Laboratory Manager
报告专用章
上海市浦东新区新金桥路1996号
No.1996,Xinjinqiao Road, Pudong New District, Shanghai, China

审 核 陶英
Reviewed by

日 期 2016.10.27
Date

No. R264041685

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

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Report No. ECL01I062655001E

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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 62321-7-1:2015	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))	N.D. ▼	0.10 µg/cm ² (LOQ)
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 ²

检测报告 Test Report

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Report No. ECL01I062655001E

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Page 3 of 6

测试样品/部位描述 银白色镀层
Tested Sample/Part Description Silver-white plating

备注: 对于检测铅, 镉, 汞之样品已完全溶解。
-N.D. = 未检出 (小于方法检出限或定量限)
-mg/kg = ppm = 百万分之一
-LOQ = 定量限, 六价铬的定量限为0.10 µg/cm²
-▼六价铬浓度小于0.10 µg/cm², 样品未检出六价铬。

Remark: **The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.**
-MDL = Method Detection Limit
-N.D. = Not Detected (<MDL or LOQ)
-mg/kg = ppm = parts per million
-LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 µg/cm²
-▼The sample is negative for Cr(VI) – The Cr(VI) concentration is below 0.10 µg/cm². The coating is considered a non-Cr(VI) based coating.

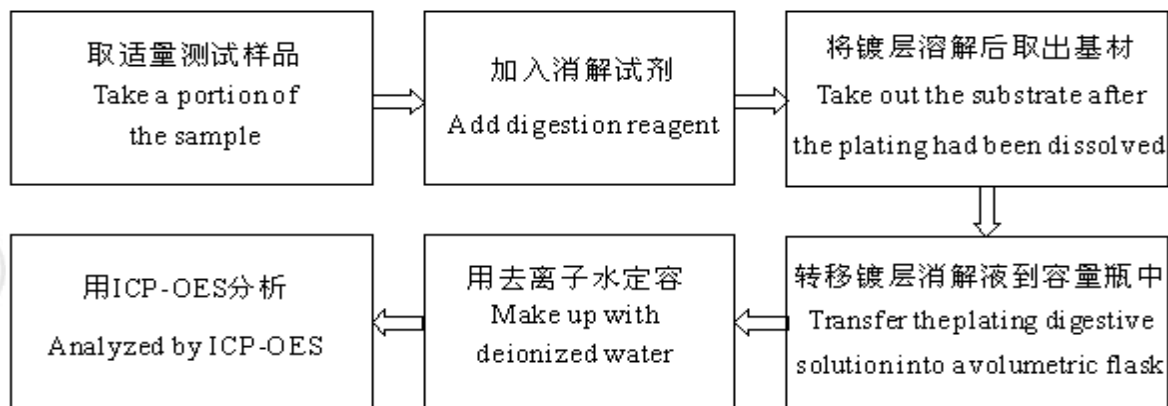
检测报告 Test Report

报告编号 ECL01H062655001E
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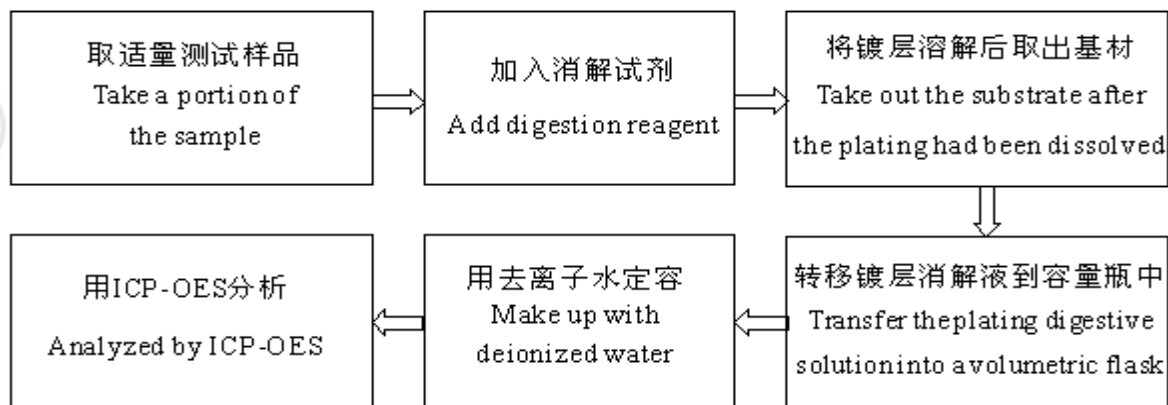
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检测流程 Test Process

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



2. 汞(Hg) Mercury (Hg)

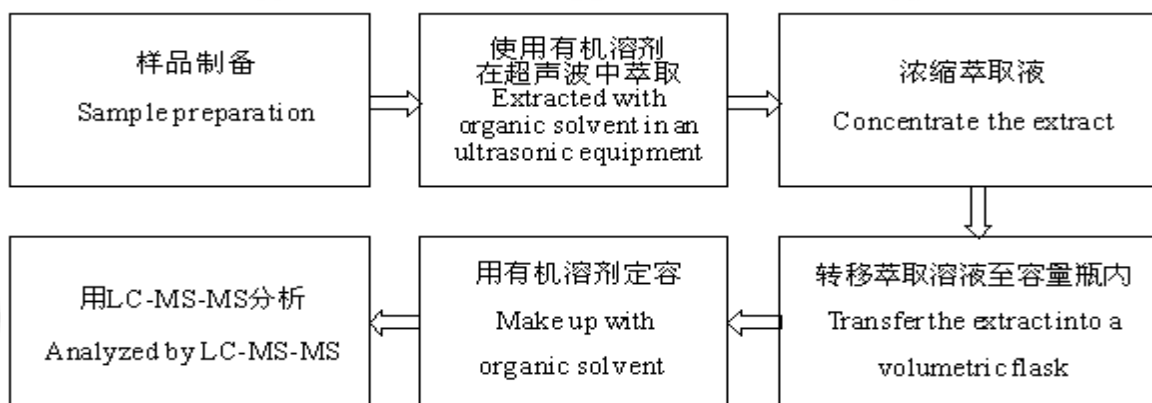


检测报告 Test Report

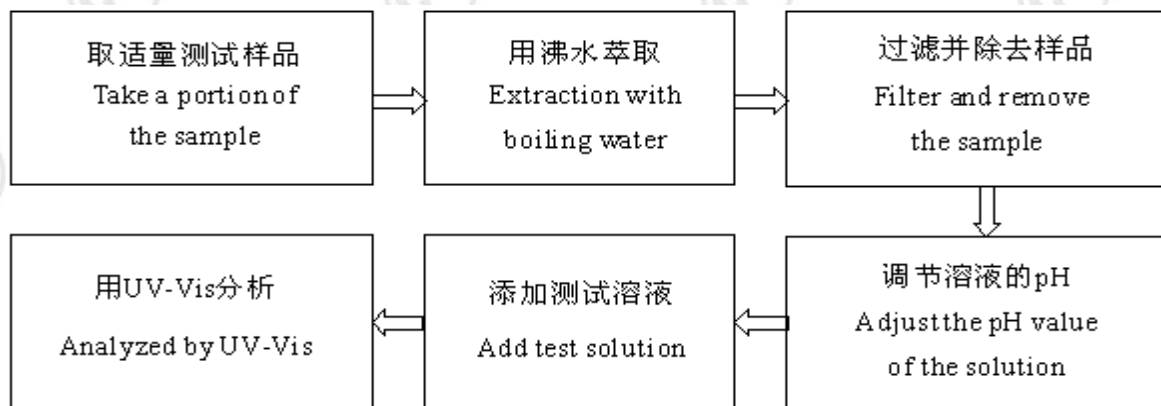
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3. 全氟辛烷磺酸盐(PFOS) Perfluorooctane Sulfonates(PFOS)



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

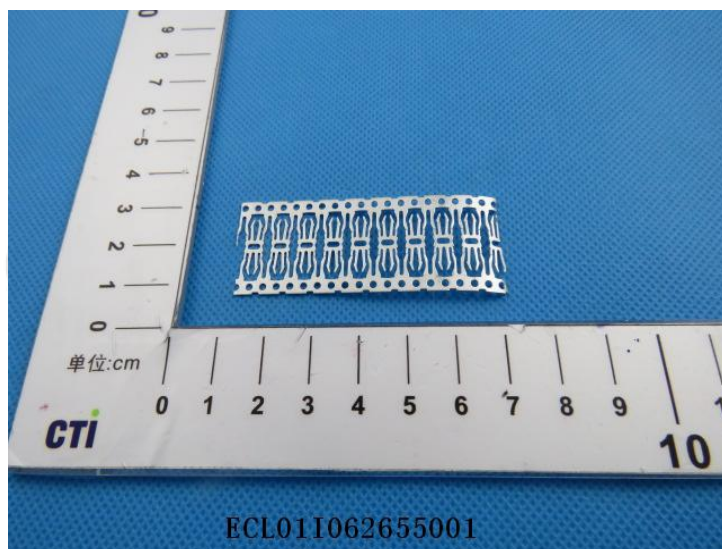


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样品图片 Photo(s) of the sample(s)



报告结束
*** End of report ***

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