

连兴旺电子(深圳)有限公司

承认书

SPECIFICATIONS FOR APPROVAL

客户:

Customer: _____

客户料号:

Customer Part No: _____

公司料号:

Part No:

26004-S20004BXX00R

产品名称:

Description:

0.5 PITCH M.2H4.2(KEY M)

发行日期:

Issue Date: _____

客户签核 (Customer Approval) :

采购	品保	工程

内部签核 (Signature) :

核准	审核	制作
张旭明	蔡雍醇	谭泽沛

连兴旺电子(深圳)有限公司

LXWCONN ELECTRONICS (SHENZHEN) CO.,LTD

TEL: +86-0755 2369 8715

FAX: +86-0755 2369 8719

ADD: 东莞市虎门镇新联社区高科一路 1 号钧益工业园 E 栋

连兴旺电子(深圳)有限公司

STANDARD SPECIFICATION

INDEX

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PRODUCT SPECIFICATION		REV	ECN No.																		
		1B	SN14***																		
DIMENSION 1.This specification covers M.2 connector. 2.The physical dimensions and the M.2 connector are shown in drawing. MATERIAL AND FINISH 1.Housing: High temperature thermoplastic, Color: Black; 2. Contact: Copper Alloy, 50-120u” Nickel under plated, Au on contact area, Au on soldering area; 3. SMT TAB: S50C, 50-120u”Nickel under plated, plating Tin (Matte)80-180u” over all; OPERATING PERFORMANCE 1.Operation Temperature: -55℃ to 85℃ 2.Voltage Rating: 30V 3.Current Rating: 0.5A ELECTRICAL PERFORMANCE																					
<table><tr><th>Test item</th><th>Test condition</th><th>Requirements</th></tr><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></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.
Test item	Test condition	Requirements																			
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连兴旺电子(深圳)有限公司 STANDARD SPECIFICATION		PRODUCT NAME: M.2 CONNECTOR																			
		DOCUMENT No: 26004-S20004BXX00R	REV: 1B																		
		PAGE: 1 OF 5																			
		APPROVED BY: Barney	CHECKED BY: Vito																		
		WRITTEN BY: TAN ZHI WU																			

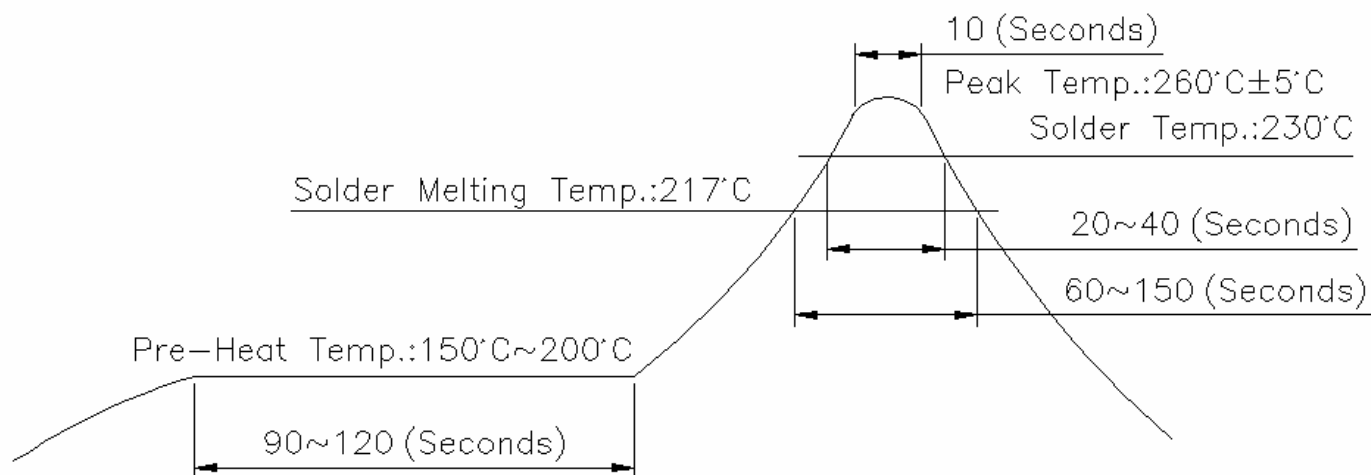
PRODUCT SPECIFICATION			REV	ECN No.
			1B	SN14***
MECHANICAL PERFORMANCE				
Test item	Test condition		Requirements	
Vibration test	EIA-364-28, test condition VII, test condition letter D(15 minutes in each of 3 mutually perpendicular directions . Both mating halves should be rigidly fixed so as not 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. △LLCR=20mΩ Max.(Final)	
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 △ LLCR=20mΩ Max.(Final) - No physical damage	
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	
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	
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		△LLCR=20mΩ Max.(Final)	
Reseating	Manually unplug/plug the connector or socket perform 3 cycles		No evidence of physical damage	
连兴旺电子(深圳)有限公司 STANDARD SPECIFICATION		TITLE: M.2 CONNECTOR		
		DOCUMENT No: 26004-S20004BXX00R		REV: 1B
		PAGE: 2 OF 5		
		APPROVED BY: Barney	CHECKED BY: Vito	WRITTEN BY: TAN ZHI WU

PRODUCT SPECIFICATION		REV	ECN No.
		1B	SN14***
ENVIRONMENTAL PERFORMANCE			
Test item	Test condition	Requirements	
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.) - EIA-364-31	- Contact resistance: $\Delta \text{LLCR} = 20\text{m}\Omega$ Max. - Insulation resistance: $500\text{M}\Omega$ Min. - No physical damage.	
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.	
Salt spray	Subject the connector to 5% salt-solution concentration at 35°C for 48 hours.	- Contact resistance: $\Delta \text{LLCR} = 20\text{m}\Omega$ Max. (Final) - No physical damage.	
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.	
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.	
Resistance to Reflow Soldering Heat	- Test connector on PCB - Pre-Heat: $100 \sim 150^{\circ}\text{C}$ - Heat: 210°C - Heat Peak: $260 \pm 5^{\circ}\text{C} / -0^{\circ}\text{C}$, $10 \pm 1\text{s}$	No physical damage	
Solder ability	- Solder Temperature: $245 \pm 5^{\circ}\text{C}$ - Solder time: $3 \pm 0.5\text{s}$	Wet solder coverage: 95% Min.	
Rework temperature	350°C, 3-5 seconds for "solder iron-Max.", temperature of component by rework process.	No Damage	
Mixed flowing gas	- EIA-364-65, Environmental Class – IIA - For 7 days, 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.	- No discontinuations of microsecond or longer duration - Contact resistance: $\Delta \text{LLCR} = 20\text{m}\Omega$ Max. (Final)	
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)	
连兴旺电子(深圳)有限公司 STANDARD SPECIFICATION		TITLE:	
		M.2 CONNECTOR	
		DOCUMENT No: 26004-S20004BXX00R	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

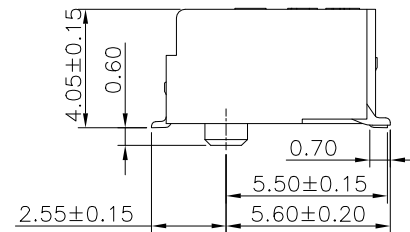
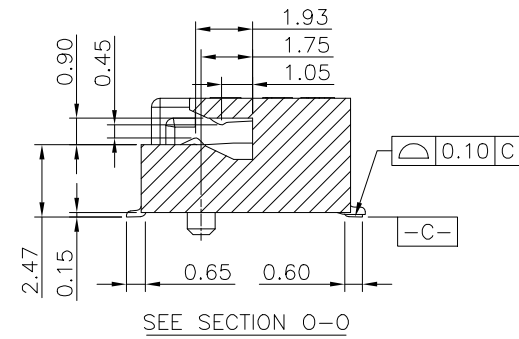
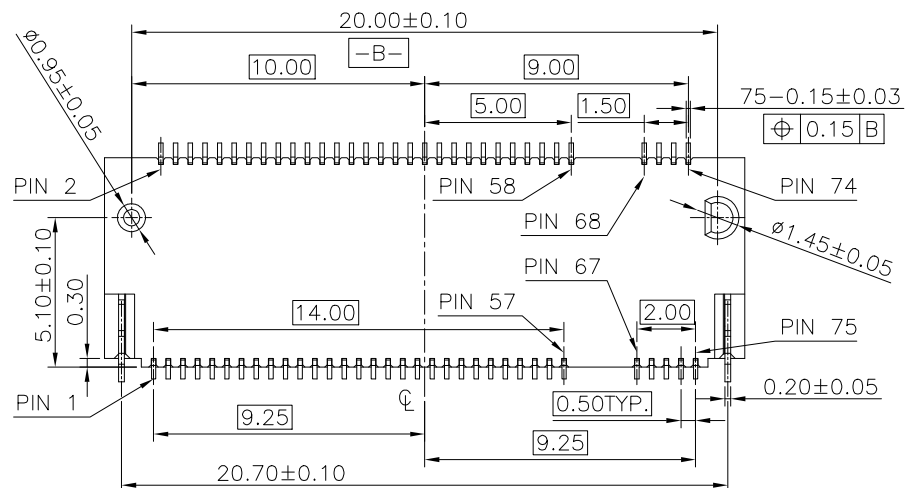
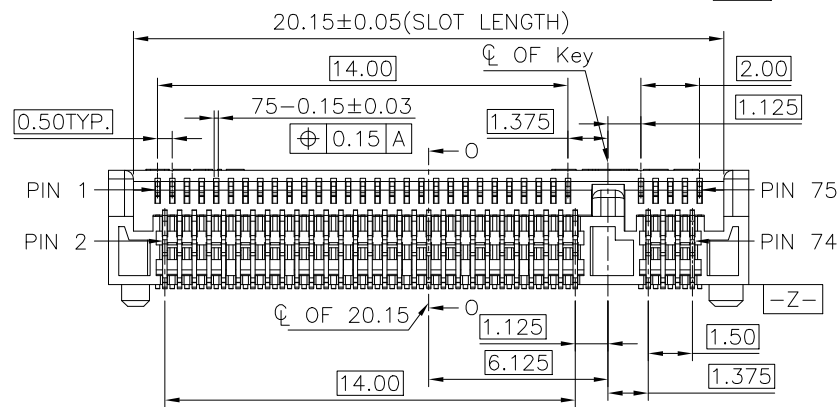
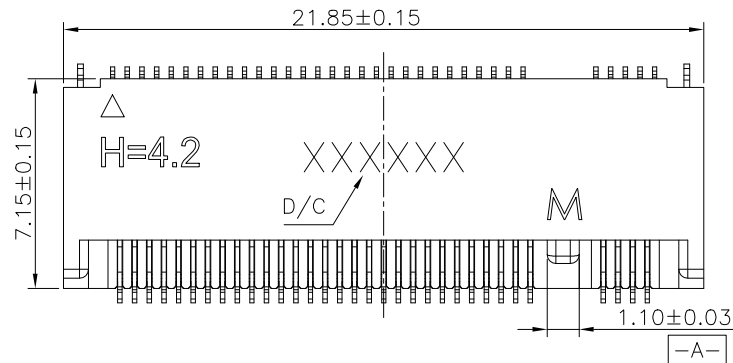


PACKAGE

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

连兴旺电子(深圳)有限公司 STANDARD SPECIFICATION	PRODUCT NAME:		
	M.2 CONNECTOR		
	DOCUMENT No: 26004-S20004BXX00R	REV: 1B	PAGE: 4 OF 5
	APPROVED BY: Barney	CHECKED BY: Vito	WRITTEN BY: TAN ZHI WU

PRODUCT SPECIFICATION					REV	ECN No.	
					1B	SN14***	
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:							
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	
连兴旺电子(深圳)有限公司 STANDARD SPECIFICATION			PRODUCT NAME:				
			M.2 CONNECTOR				
			DOCUMENT No:		REV:	PAGE:	
			26004-S20004BXX00R		1B	5 OF 5	
			APPROVED BY:		CHECKED BY:		WRITTEN BY:
			Barney		Vito		
					TAN ZHI WU		



RoHS
Compliant
2013/95/EC



CUSTOMER DRAWING		 连兴旺电子(深圳)有限公司 LXWCONN ELECTRONICS (SHENZHEN) CO., LTD			
GENERAL TOLERANCE .X ±0.35 .XX ±0.25 .XXX ±0.15 ANGLE ±3°		DESIGN Tan 2026.05.11	TITLE 0.5 PITCH M.2H4.2(KEY M)		
SIZE A4		CHECKED Tan 2026.05.11	PART NO. 26004-S20004BXX00R		
APPROVAL Tan 2026.05.11		SCALE 1:1	UNITS MM	REV. A	SHEET 1 OF 5

TABLE:

NO.	PART NO.	DESCRIPTION	DURABILITY
1	26004-S20004BGF00R	GOLD G/F ON CONTACT AREA	25 CYCLES
		GOLD G/F ON SOLDER AREA	
2	26004-S20004BG600R	GOLD 10u" ON CONTACT AREA	25 CYCLES
		GOLD G/F ON SOLDER AREA	
3	26004-S20004BG700R	GOLD 15u" ON CONTACT AREA	25 CYCLES
		GOLD G/F ON SOLDER AREA	
4	26004-S20004BG800R	GOLD 30u" ON CONTACT AREA	60 CYCLES
		GOLD G/F ON SOLDER AREA	

26004 - S 2 xxx 4 B xx 00 R

R: roll bag

CG: Gold-plated G/F
C1: Gold-plated 1u"
:

B: BLACK

90°SMT

004: 2x2P
006: 2x4p
:

double row

socket

pcie CONNECTOR

Notes:

1.MATERIAL SPECIFICATION:

1.1.HOUSING:LCP+40% GF,UL94V-0,COLOR:BLACK.

1.2.CONTACT:COPPER ALLOY.

1.3.PEG:STEEL.

2.PLATING SPECIFICATION:

2.1.CONTACT:50u"MIN.NICKEL UNDER PLATINGOVER
ALL.PLATING ON SOLDER AREA:SEE TABLE

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.MECHANICAL PERFORMANCE:

4.1.DURABILITY:SEE TABLE

5.ELECTRICAL PERFORMANCE:

5.1.CURRENT:0.5A PER PIN.

5.2.LLCR:INITIAL 55ml MAX.;FINAL <LLCR=20m 〇 MAX.

6.IR REFLOW:

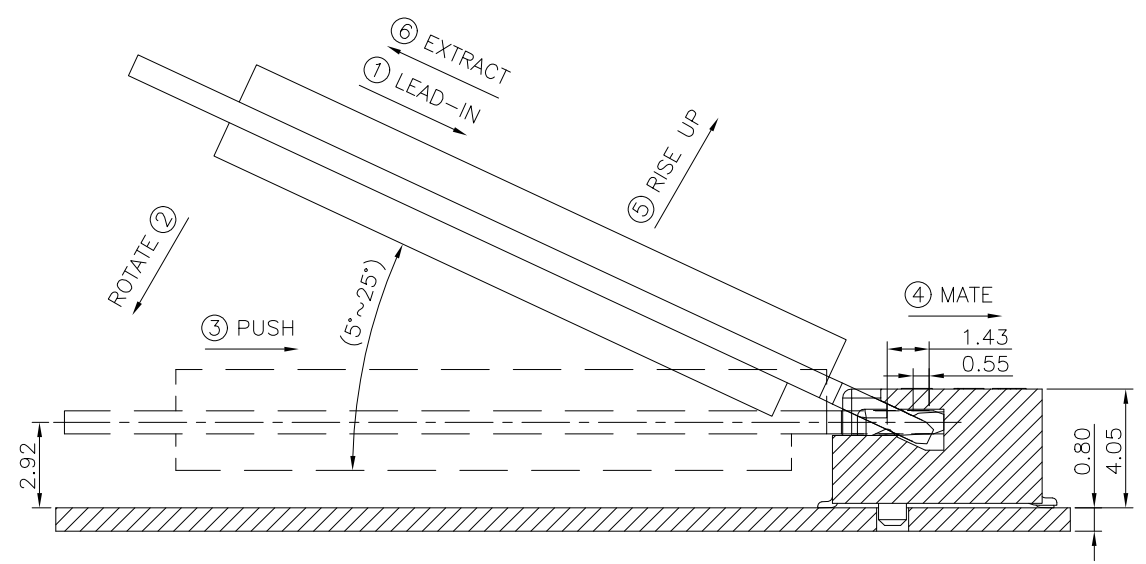
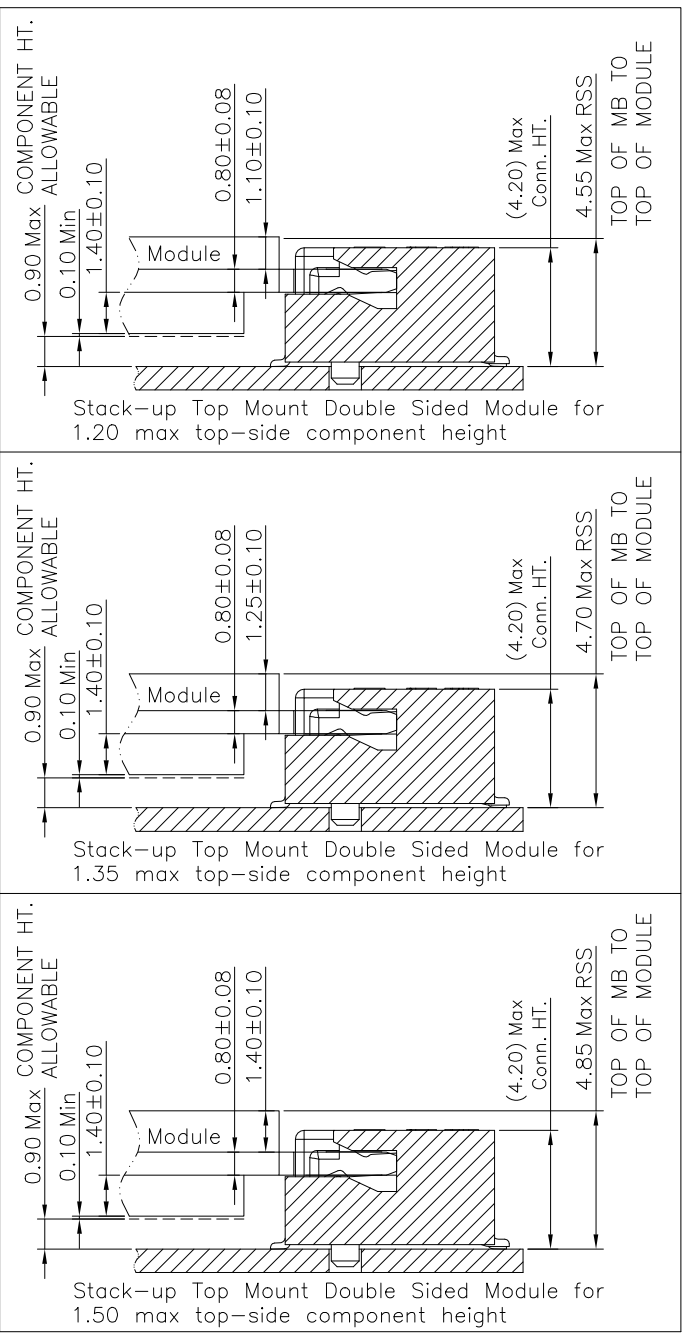
THE TEMPERATURE SHALL BE 260 +5 〇 MAINTAINING
10 +1 SECONDS.

RoHS
Compliant
2013/95/EC



CUSTOMER DRAWING		 连兴旺电子(深圳)有限公司 connectivity LXWCONN ELECTRONICS (SHENZHEN) CO., LTD				
GENERAL TOLERANCE .X ±0.35 .XX ±0.25 .XXX ±0.15 ANGLE±3°		DESIGN Tan 2026.05.11	TITLE 0.5 PITCH M.2H4.2(KEY M)			
		CHECKED Tan 2026.05.11	PART NO. 26004-S20004BXX00R			
SIZE A4		APPROVAL Tan 2026.05.11	SCALE 1:1	UNITS MM	REV. A	SHEET 2 OF 5

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.

CUSTOMER DRAWING		LXW 连兴旺电子(深圳)有限公司 connectivity LXWCONN ELECTRONICS (SHENZHEN) CO., LTD			
GENERAL TOLERANCE .X ±0.35 .XX ±0.25 .XXX ±0.15 ANGLE±3°		DESIGN Tan 2026.05.11	TITLE 0.5 PITCH M.2H4.2<KEY M>		
SIZE A4		CHECKED Tan 2026.05.11	PART NO. 26004-S20004BXX00R		
APPROVAL Tan 2026.05.11		SCALE 1:1	UNITS MM	REV. A	SHEET 3 OF 5

PRODUCT RELIABILITY TEST REPORT

ReportNo:GL-SZ20130916-02

product:NGFF 4.2H M-Key CONNECTOR

Part NO:APCI0107-P00*A

Test Object:Product Reliability Test

Sample Quantity:30PCS

Test Environment:20~22℃;50~54%RH

Date of Test:2013-09-18~2013-11-12

Prepared By:覃庭

Checked By:苏士坤

Approved By:苏士坤

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-SZ20130916-02

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-SZ20130916-02

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 20mV voltage(Max)	- Initial 55mΩ Max. - Final Δ 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 300V/AC for one minute between adjacent contacts of unmated connector assemblies.	- No breakdown or flash - Current leakage: 0.5 mA
5	Temperature rise 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 Δ T=30°C 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	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
10	Durability	EIA-364-09 Option1: Repeat insertion the Card to the onnector and extraction Card from the connector for 25	Δ LLCR=20mΩ Max.(Final)

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130916-02

GL-P-027-005

		cycles(Au:30u"Max). • Option2:Repeat insertion the Card to the connector and extraction Card from the connector for 60 cycles(Au:30u"Min).	
11	Reseating	• Manually unplug/plug the connector or socket perform 3 cycles	• No evidence of physical damage
12	Cyclic temperature & Humidity	• EIA-364-31 • 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 $80\% \pm 3\%$ RH and $65^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 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: $\Delta\text{LLCR}=20\text{m}\Omega$ Max. • Insulation resistance:500M Ω Min. • No physical damage.
13	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.
14	Salt spray	• Subject the connector to 5% salt-solution concentration at 35°C for 48 hours.	• Contact resistance: $\Delta\text{LLCR}=20\text{m}\Omega$ Max .(Final) • No physical damage.
15	Temperature life	EIA-364-17 • Mate PCB module and subject to $105 \pm 2^{\circ}\text{C}$ for 120 hours	• 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.
17	Resistance to Reflow Soldering Heat	• Test connector on PCB • Pre-Heat : $100 \sim 150^{\circ}\text{C}$ • Heat : 210°C • Heat Peak : $260 \pm 5^{\circ}\text{C}$, $10 \pm 1\text{s}$	• No physical damage
18	Solder ability	• Solder Temperature : $245 \pm 5^{\circ}\text{C}$ • Solder time : $3 \pm 0.5\text{s}$	• Wet solder coverage: 95% Min.
19	Rework temperature	• 350°C ,3-5seconds for "solder iron-Max.", temperature of component by rework process.	• No Damage
20	Mixed flowing gas	• 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	• No discontinuations of microsecond or longer duration • Contact resistance:

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130916-02

GL-P-027-005

		mated exposure 56 hours.	Δ LLCR=20m Ω Max. (Final)
21	Thermal disturbance	• Cycle the mated connector between 15°C$\pm$3°C and 85°C$\pm$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: ΔLLCR=20mΩ Max. (Final)

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130916-02

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	42.33	48.87	43.42	44.88	46.54	mΩ	Pass
3	Durability	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Temperature life	Normal	Normal	Normal	Normal	Normal	/	Pass
5	LLCR	50.12	43.60	43.92	42.53	43.93	mΩ	Pass
	△LLCR	10.54	12.91	11.90	11.89	13.78	mΩ	Pass
6	Reseating	Normal	Normal	Normal	Normal	Normal	/	Pass
7	LLCR	44.43	44.68	42.46	44.69	44.68	mΩ	Pass
	△LLCR	12.25	12.48	15.22	10.25	12.38	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	43.23	40.69	44.28	42.52	43.02	mΩ	Pass
3	Durability	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Thermal Shock	Normal	Normal	Normal	Normal	Normal	/	Pass
5	LLCR	43.70	43.60	46.31	43.01	44.74	mΩ	Pass
	△LLCR	4.19	5.71	11.25	3.94	5.77	mΩ	Pass
6	Cyclic temperature(Humidity)	Normal	Normal	Normal	Normal	Normal	/	Pass
7	LLCR	46.03	41.73	40.07	44.35	43.85	mΩ	Pass
	△LLCR	6.26	4.71	7.69	6.42	4.89	mΩ	Pass
8	Reseating	Normal	Normal	Normal	Normal	Normal	/	Pass
9	LLCR	44.08	41.96	39.85	43.97	43.25	mΩ	Pass
	△LLCR	4.32	4.77	7.22	5.47	4.57	mΩ	Pass
10	Examination of product	Normal	Normal	Normal	Normal	Normal	/	Pass

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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	41.34	43.01	48.81	46.18	43.36	mΩ	Pass
3	Durability	Normal	Normal	Normal	Normal	Normal	/	Pass
4	Temperature life (Preconditioning)	Normal	Normal	Normal	Normal	Normal	/	Pass
5	LLCR	46.12	49.79	52.69	49.51	45.93	mΩ	Pass
	△LLCR	6.71	9.58	8.25	7.14	6.14	mΩ	Pass
6	Vibration	Normal	Normal	Normal	Normal	Normal	/	Pass
7	LLCR	52.23	49.25	49.37	52.08	49.08	mΩ	Pass
	△LLCR	11.55	7.80	11.32	9.71	10.46	mΩ	Pass
8	Mechanical shock	Normal	Normal	Normal	Normal	Normal	/	Pass
9	LLCR	50.05	57.74	47.67	46.89	51.51	mΩ	Pass
	△LLCR	12.70	14.73	7.69	10.08	15.16	mΩ	Pass
10	Examination of product	Normal	Normal	Normal	Normal	Normal	/	Pass

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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	46.82	48.61	45.14	44.44	44.86	mΩ	Pass
3	Insertion Force	0.14	0.16	0.12	0.13	0.12	kgf	Pass
	Removal Force	0.12	0.14	0.10	0.15	0.10	kgf	Pass
4	Durability	Normal	Normal	Normal	Normal	Normal	/	Pass
5	Insertion Force	0.11	0.12	0.14	0.15	0.13	kgf	Pass
	Removal Force	0.09	0.11	0.12	0.11	0.10	kgf	Pass
6	LLCR	45.94	45.02	44.96	47.06	45.16	mΩ	Pass
	△LLCR	0.57	0.29	0.49	1.00	0.12	mΩ	Pass
7	Durability	Normal	Normal	Normal	Normal	Normal	/	Pass
8	Insertion Force	0.13	0.10	0.09	0.12	0.11	kgf	Pass
	Removal Force	0.11	0.08	0.07	0.09	0.08	kgf	Pass
9	LLCR	45.08	45.06	45.12	45.18	43.52	mΩ	Pass
	△LLCR	0.60	0.09	1.57	0.08	0.02	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	<0.5	<0.5	<0.5	<0.5	<0.5	mA	Pass
3	Insulation Resistance	>500	>500	>500	>500	>500	MΩ	Pass
4	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	Temperature versus current	19.85	19.95	20.56	20.65	19.95	℃	Pass

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4.The LLCR as follow: (Unit: mΩ)

Group A

NO.	Initial					After Durability(precondition)&Temperature life					△ LLCR				
	A-1	A-2	A-3	A-4	A-5	A-1	A-2	A-3	A-4	A-5	A-1	A-2	A-3	A-4	A-5
1	31.20	37.05	30.54	33.07	34.72	40.27	38.17	40.40	32.51	38.05	9.08	1.12	9.87	0.55	3.33
2	31.99	36.99	31.39	31.77	34.24	41.70	35.20	31.04	32.61	33.28	9.71	1.79	0.36	0.84	0.96
3	31.22	38.37	30.94	30.86	33.36	40.48	42.24	39.80	38.26	37.33	9.26	3.88	8.86	7.40	3.97
4	33.91	37.88	31.68	32.24	45.09	34.83	30.95	31.93	39.72	36.78	0.93	6.94	0.26	7.48	8.32
5	36.32	38.82	31.97	32.69	34.67	31.67	33.91	43.87	42.31	36.88	4.65	4.91	11.90	9.62	2.21
6	31.89	39.85	33.37	32.34	34.32	42.43	40.96	37.24	35.52	38.27	10.54	1.11	3.87	3.18	3.95
7	32.47	35.91	32.46	32.88	35.66	35.47	31.18	37.53	33.12	35.00	3.01	4.74	5.07	0.23	0.66
8	30.03	38.17	31.33	32.97	37.05	30.77	43.30	37.02	42.53	41.89	0.73	5.13	5.69	9.56	4.84
9	35.46	42.12	34.37	37.78	39.03	35.49	38.65	31.78	31.04	35.16	0.03	3.47	2.59	6.74	3.87
10	34.37	37.97	38.10	39.94	38.65	37.44	38.53	33.84	41.38	30.80	3.07	0.56	4.27	1.44	7.85
11	35.80	43.47	41.04	42.60	42.03	40.43	32.68	43.92	34.78	38.92	4.63	10.79	2.88	7.82	3.12
12	42.33	44.72	39.53	44.09	39.97	41.41	31.82	35.89	32.32	37.06	0.92	12.91	3.64	11.77	2.91
13	40.02	48.87	36.65	44.88	44.87	36.82	39.51	31.74	33.00	32.44	3.19	9.36	4.91	11.89	12.43
14	41.58	44.81	39.75	43.55	46.54	34.15	39.27	41.72	34.94	43.93	7.44	5.54	1.97	8.61	2.60
15	39.47	43.55	43.09	39.59	45.38	31.64	35.78	37.90	35.99	31.61	7.84	7.77	5.19	3.60	13.78
16	42.24	42.46	43.42	43.13	35.68	44.78	43.60	40.52	36.28	41.00	2.54	1.14	2.90	6.86	5.31
17	39.77	40.87	26.36	31.68	41.08	40.64	39.85	35.18	36.64	43.18	0.87	1.03	8.82	4.96	2.10
18	41.83	36.29	25.36	40.12	33.47	50.12	38.24	26.89	35.26	33.87	8.29	1.95	1.53	4.86	0.40
MAX	42.33	48.87	43.42	44.88	46.54	50.12	43.60	43.92	42.53	43.93	10.54	12.91	11.90	11.89	13.78
MIN	30.03	35.91	25.36	30.86	33.36	30.77	30.95	26.89	31.04	30.80	0.03	0.56	0.26	0.23	0.40
Aver	36.21	40.45	34.52	37.01	38.66	38.36	37.43	36.57	36.01	36.97	4.82	4.67	4.70	5.97	4.59

NO.	After Reseating					△ LLCR				
	A-1	A-2	A-3	A-4	A-5	A-1	A-2	A-3	A-4	A-5
1	43.45	31.24	41.78	30.78	43.32	12.25	5.81	11.25	2.29	8.61
2	44.20	41.44	34.17	32.69	44.68	12.21	4.45	2.78	0.93	10.44
3	35.37	44.68	32.82	34.71	44.46	4.15	6.31	1.89	3.86	11.11
4	36.81	36.38	37.47	42.49	32.72	2.90	1.50	5.79	10.25	12.38
5	33.06	32.21	31.87	34.78	37.51	3.26	6.61	0.11	2.09	2.84
6	31.33	41.13	42.46	35.61	38.44	0.57	1.28	9.09	3.27	4.13
7	38.82	31.29	33.73	40.00	36.37	6.35	4.63	1.27	7.11	0.71
8	40.56	31.26	31.26	35.81	39.36	10.53	6.91	0.07	2.84	2.30
9	41.01	44.52	32.01	44.33	34.83	5.55	2.40	2.36	6.55	4.20
10	39.85	37.86	39.40	32.17	36.59	5.48	0.11	1.30	7.77	2.06
11	43.16	42.59	37.24	40.53	35.95	7.36	0.88	3.80	2.07	6.08
12	41.31	35.99	41.08	35.07	36.85	1.02	8.74	1.55	9.02	3.13
13	32.99	36.39	41.34	44.39	43.28	7.03	12.48	4.69	0.49	1.58
14	44.43	35.02	36.20	44.69	35.64	2.85	9.80	3.55	1.14	10.90

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15	39.20	43.13	33.30	36.88	44.62	0.27	0.41	9.79	2.70	0.77
16	36.87	42.44	34.41	41.69	39.25	5.37	0.01	9.01	1.45	3.57
17	39.08	44.08	41.58	40.09	40.17	0.69	3.21	15.22	8.41	0.91
18	32.96	29.31	35.69	30.42	30.15	8.87	6.98	10.33	9.70	3.32
MAX	44.43	44.68	42.46	44.69	44.68	12.25	12.48	15.22	10.25	12.38
MIN	31.33	29.31	31.26	30.42	30.15	0.27	0.01	0.07	0.49	0.71
Aver	38.58	37.83	36.54	37.62	38.57	5.37	4.58	5.21	4.55	4.95

Group B

NO.	Initial					After Durability & Thermal Shock					△ LLCR				
	B-1	B-2	B-3	B-4	B-5	B-1	B-2	B-3	B-4	B-5	B-1	B-2	B-3	B-4	B-5
1	35.18	38.36	38.89	36.17	39.74	35.09	36.21	40.14	36.01	38.78	0.09	2.16	1.25	0.16	0.96
2	37.23	38.73	38.96	37.21	39.06	39.60	34.23	34.05	37.10	37.84	2.37	4.50	4.91	0.11	1.23
3	37.43	37.85	36.42	34.70	35.97	37.14	36.60	41.07	35.04	38.59	0.29	1.25	4.65	0.34	2.63
4	35.00	37.80	37.81	36.05	37.33	34.37	33.67	34.06	35.42	37.54	0.63	4.13	3.75	0.63	0.21
5	36.64	37.62	39.45	36.09	37.24	38.85	35.44	35.21	34.60	36.46	2.21	2.18	4.25	1.49	0.77
6	36.19	36.87	37.52	34.30	37.64	38.28	41.09	37.09	34.18	37.08	2.09	4.22	0.43	0.12	0.56
7	36.08	36.70	36.99	34.60	38.99	35.89	37.46	36.07	37.06	35.29	0.20	0.76	0.92	2.46	3.70
8	37.25	36.21	35.98	36.10	37.65	37.13	33.60	38.99	36.06	35.89	0.11	2.61	3.02	0.03	1.76
9	40.84	39.53	39.46	39.73	39.41	36.65	38.60	39.48	40.31	33.64	4.19	0.93	0.02	0.58	5.77
10	40.11	37.02	38.96	37.49	39.06	39.21	39.86	39.33	41.43	44.74	0.89	2.83	0.38	3.94	5.68
11	40.31	39.55	34.55	40.59	41.04	40.10	43.53	45.80	39.94	42.53	0.22	3.99	11.25	0.65	1.49
12	41.46	35.95	39.78	40.98	36.56	42.66	35.93	46.31	43.01	38.80	1.20	0.02	6.53	2.03	2.24
13	43.23	38.43	36.79	41.58	42.54	43.70	33.94	38.36	39.56	44.26	0.47	4.49	1.58	2.02	1.72
14	39.77	36.63	37.31	37.54	42.90	39.61	37.24	37.25	38.80	43.83	0.16	0.61	0.06	1.26	0.93
15	41.48	35.92	38.08	39.66	39.19	40.93	41.63	36.98	39.54	42.13	0.55	5.71	1.10	0.13	2.94
16	38.14	40.69	38.84	42.52	39.62	37.54	39.91	34.61	42.88	39.09	0.60	0.78	4.23	0.36	0.53
17	39.64	37.38	44.28	37.43	39.24	38.93	36.93	40.10	38.73	41.57	0.72	0.45	4.18	1.30	2.33
18	42.80	38.76	40.52	42.15	43.02	43.52	43.60	42.55	41.40	42.63	0.72	4.84	2.03	0.75	0.39
Max	43.23	40.69	44.28	42.52	43.02	43.70	43.60	46.31	43.01	44.74	4.19	5.71	11.25	3.94	5.77
Min	35.00	35.92	34.55	34.30	35.97	34.37	33.60	34.05	34.18	33.64	0.09	0.02	0.02	0.03	0.21
Aver	38.82	37.78	38.36	38.05	39.23	38.84	37.75	38.75	38.39	39.48	0.98	2.58	3.03	1.02	1.99

NO.	After Cyclic temperature & humidity					△ LLCR				
	B-1	B-2	B-3	B-4	B-5	B-1	B-2	B-3	B-4	B-5
1	34.76	37.12	38.12	35.54	35.37	0.42	1.25	0.77	0.63	4.37
2	35.38	36.14	37.20	37.15	35.65	1.86	2.59	1.76	0.06	3.42
3	35.51	34.31	38.18	34.16	35.17	1.92	3.53	1.76	0.53	0.80
4	34.63	36.65	37.08	33.52	37.58	0.37	1.15	0.73	2.54	0.24
5	36.38	34.96	36.38	35.03	36.10	0.27	2.65	3.08	1.07	1.14
6	36.10	35.78	36.13	33.55	36.46	0.09	1.09	1.39	0.75	1.18
7	36.81	37.28	38.26	36.52	35.22	0.73	0.57	1.26	1.92	3.77
8	37.30	36.70	38.20	35.46	38.35	0.05	0.49	2.23	0.64	0.70
9	36.63	39.18	39.45	38.18	39.85	4.21	0.35	0.01	1.56	0.45
10	38.55	41.73	35.38	40.25	40.30	1.56	4.71	3.58	2.76	1.24
11	37.80	38.85	36.30	41.35	43.08	2.51	0.70	1.75	0.76	2.04

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12	38.10	36.93	37.54	34.56	41.46	3.36	0.97	2.25	6.42	4.89
13	42.66	38.05	38.52	41.06	43.85	0.58	0.38	1.73	0.52	1.31
14	46.03	37.95	37.70	38.70	40.83	6.26	1.32	0.39	1.16	2.08
15	42.88	36.17	39.05	38.12	36.45	1.41	0.25	0.97	1.54	2.74
16	41.05	36.70	37.71	37.72	41.68	2.91	3.99	1.13	4.80	2.06
17	38.40	37.71	36.59	41.20	40.06	1.24	0.33	7.69	3.78	0.82
18	40.96	40.78	40.07	44.35	38.46	1.84	2.02	0.45	2.20	4.56
Max	46.03	41.73	40.07	44.35	43.85	6.26	4.71	7.69	6.42	4.89
Min	34.63	34.31	35.38	33.52	35.17	0.05	0.25	0.01	0.06	0.24
Aver	38.33	37.39	37.66	37.58	38.66	1.75	1.57	1.83	1.87	2.10

NO.	After Reseating					△ LLCR				
	B-1	B-2	B-3	B-4	B-5	B-1	B-2	B-3	B-4	B-5
1	36.09	36.91	38.80	35.94	35.75	0.91	1.45	0.09	0.23	3.99
2	39.21	38.09	39.37	36.66	36.31	1.98	0.64	0.41	0.55	2.75
3	39.90	38.54	39.09	35.05	36.99	2.47	0.69	2.67	0.35	1.03
4	35.19	37.41	38.57	34.66	38.08	0.19	0.39	0.76	1.39	0.75
5	36.97	37.71	39.23	34.49	36.46	0.33	0.09	0.23	1.60	0.78
6	37.24	37.17	38.06	33.65	34.16	1.04	0.30	0.55	0.65	3.48
7	37.59	38.08	38.70	36.13	37.05	1.51	1.38	1.71	1.53	1.94
8	38.41	37.54	39.54	36.07	37.56	1.17	1.33	3.56	0.02	0.09
9	38.57	39.08	38.80	38.84	38.91	2.27	0.44	0.66	0.89	0.50
10	38.76	40.06	37.17	39.73	41.83	1.35	3.04	1.79	2.24	2.77
11	39.25	41.96	38.33	41.58	41.55	1.07	2.42	3.78	0.99	0.51
12	39.43	37.58	38.04	35.51	35.07	2.03	1.63	1.74	5.47	1.49
13	43.55	38.81	39.76	41.32	41.44	0.32	0.38	2.97	0.26	1.10
14	44.08	37.94	38.06	38.84	38.34	4.32	1.30	0.75	1.29	4.57
15	41.20	35.51	39.59	37.70	38.22	0.27	0.42	1.51	1.97	0.97
16	41.30	35.91	38.41	38.81	38.67	3.16	4.77	0.43	3.71	0.95
17	38.57	37.48	37.06	40.12	40.73	1.07	0.10	7.22	2.70	1.49
18	40.65	41.12	39.85	43.97	43.25	2.15	2.36	0.67	1.82	0.23
Max	44.08	41.96	39.85	43.97	43.25	4.32	4.77	7.22	5.47	4.57
Min	35.19	35.51	37.06	33.65	34.16	0.19	0.09	0.09	0.02	0.09
Aver	39.22	38.16	38.69	37.72	38.35	1.53	1.29	1.75	1.54	1.63

Group C

NO.	Initial					After Durability&Temperature life					△LLCR				
	C-1	C-2	C-3	C-4	C-5	C-1	C-2	C-3	C-4	C-5	C-1	C-2	C-3	C-4	C-5
1.00	34.79	38.51	36.54	35.96	34.22	40.96	41.75	37.81	38.17	40.36	6.17	3.24	1.27	2.21	6.14
2.00	36.12	37.46	37.91	37.83	35.22	36.06	39.77	35.63	40.69	36.87	0.05	2.31	2.28	2.86	1.65
3.00	36.80	39.61	34.92	37.20	35.06	36.71	36.49	34.46	39.09	39.33	0.09	3.12	0.46	1.88	4.27
4.00	38.83	37.82	38.83	35.68	34.47	35.71	36.77	34.94	36.71	38.37	3.12	1.05	3.89	1.03	3.90
5.00	34.72	39.21	37.34	34.48	34.29	34.38	32.30	36.88	37.29	32.89	0.34	6.91	0.46	2.81	1.40
6.00	34.96	38.27	35.31	34.73	34.66	33.91	36.88	35.94	36.07	35.00	1.05	1.39	0.63	1.34	0.34
7.00	35.75	37.26	34.84	39.22	34.17	36.03	36.96	35.17	35.65	34.95	0.28	0.29	0.33	3.57	0.78
8.00	35.56	37.26	35.22	34.96	33.74	35.92	38.77	35.51	35.80	35.80	0.36	1.51	0.29	0.84	2.05

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9.00	38.36	39.55	40.47	41.60	40.43	41.50	41.02	42.76	43.22	41.99	3.14	1.47	2.29	1.62	1.56
10.00	38.70	41.35	41.22	42.28	38.81	38.52	42.61	40.73	43.33	41.85	0.18	1.27	0.50	1.05	3.04
11.00	38.05	40.21	39.55	39.09	37.09	44.15	49.79	39.99	41.17	40.37	6.11	9.58	0.44	2.08	3.29
12.00	40.21	41.70	43.50	39.09	42.01	44.12	42.38	43.88	42.02	41.62	3.91	0.69	0.38	2.94	0.39
13.00	41.34	40.77	39.82	37.77	38.62	39.77	39.53	38.65	39.12	41.19	1.57	1.24	1.17	1.35	2.56
14.00	40.69	38.47	40.18	36.80	43.36	40.76	39.28	42.67	40.64	44.22	0.08	0.81	2.49	3.83	0.86
15.00	37.58	41.25	35.07	40.76	40.78	38.05	38.84	43.31	40.76	39.55	0.47	2.41	8.25	0.00	1.23
16.00	36.54	38.45	37.24	38.66	37.12	36.08	43.51	41.80	38.18	38.02	0.46	5.06	4.55	0.48	0.91
17.00	37.35	41.33	41.98	46.18	41.71	37.48	42.11	49.84	44.23	40.67	0.13	0.78	7.86	1.96	1.04
18.00	39.41	43.01	48.81	42.37	41.26	46.12	45.16	52.69	49.51	45.93	6.71	2.15	3.88	7.14	4.67
MAX	41.34	43.01	48.81	46.18	43.36	46.12	49.79	52.69	49.51	45.93	6.71	9.58	8.25	7.14	6.14
MIN	34.72	37.26	34.84	34.48	33.74	33.91	32.30	34.46	35.65	32.89	0.05	0.29	0.29	0.00	0.34
Aver	37.54	39.52	38.82	38.59	37.61	38.68	40.22	40.15	40.09	39.39	1.90	2.51	2.30	2.17	2.23

NO.	After Vibration					△LLCR				
	C-1	C-2	C-3	C-4	C-5	C-1	C-2	C-3	C-4	C-5
1	36.96	36.63	37.62	36.19	37.26	2.17	1.88	1.08	0.23	3.05
2	38.01	36.40	38.24	36.75	35.01	1.90	1.06	0.34	1.09	0.22
3	37.73	41.79	38.16	36.46	35.17	0.93	2.19	3.24	0.74	0.11
4	38.26	38.23	38.12	37.93	36.05	0.57	0.41	0.71	2.24	1.58
5	36.22	38.73	37.05	37.93	35.45	1.51	0.47	0.29	3.45	1.16
6	35.90	38.97	37.13	37.40	34.42	0.94	0.70	1.82	2.67	0.24
7	36.85	36.24	30.62	36.86	34.26	1.10	1.01	4.22	2.36	0.09
8	41.51	38.43	37.14	36.55	35.18	5.95	1.17	1.92	1.59	1.44
9	43.30	40.19	40.67	42.09	41.48	4.94	0.64	0.19	0.48	1.06
10	45.94	45.81	40.31	41.74	48.08	7.24	4.46	0.91	0.54	9.27
11	41.78	48.01	46.45	30.76	46.14	3.73	7.80	6.90	8.33	9.05
12	49.51	42.76	43.36	44.57	41.11	9.29	1.06	0.13	5.48	0.90
13	43.71	40.87	44.56	41.69	49.08	2.37	0.09	4.74	3.92	10.46
14	52.23	39.33	44.08	40.30	45.80	11.55	0.86	3.90	3.50	2.44
15	43.79	40.33	40.41	41.96	45.30	6.21	0.92	5.34	1.20	4.52
16	43.22	38.67	48.56	42.18	40.45	6.68	0.22	11.32	3.52	3.33
17	48.67	44.75	45.68	51.63	46.58	11.32	3.43	3.70	5.45	4.88
18	45.67	49.25	49.37	52.08	44.26	6.26	6.24	0.56	9.71	3.00
MAX	52.23	49.25	49.37	52.08	49.08	11.55	7.80	11.32	9.71	10.46
MIN	35.90	36.24	30.62	30.76	34.26	0.57	0.09	0.13	0.23	0.09
Aver	42.18	40.85	40.97	40.28	40.61	4.70	1.92	2.85	3.14	3.15

NO.	After Mechanical Shock					△LLCR				
	C-1	C-2	C-3	C-4	C-5	C-1	C-2	C-3	C-4	C-5
1	36.91	36.44	37.32	36.84	38.81	2.12	2.07	0.77	0.88	4.59
2	35.72	35.62	38.54	38.67	39.71	0.40	1.84	0.63	0.84	4.48
3	35.06	38.05	39.94	38.16	38.60	1.75	1.56	5.02	0.96	3.54
4	44.85	38.33	40.93	38.66	38.24	6.01	0.51	2.10	2.98	3.76
5	41.55	37.76	38.56	38.43	38.35	6.83	1.45	1.23	3.95	4.06
6	38.63	37.07	39.01	39.14	44.47	3.68	1.20	3.70	4.41	9.81

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130916-02

GL-P-027-005

7	40.84	36.90	42.00	39.69	49.32	5.09	0.36	7.15	0.48	15.16
8	41.31	38.02	37.91	38.82	38.95	5.75	0.76	2.69	3.86	5.21
9	41.29	36.38	43.22	38.07	40.24	2.93	3.17	2.75	3.54	0.18
10	39.66	35.97	44.83	37.74	39.42	0.96	5.38	3.61	4.54	0.60
11	43.45	36.89	42.79	41.74	35.99	5.40	3.32	3.24	2.64	1.09
12	43.06	39.16	42.66	45.45	40.87	2.85	2.54	0.84	6.37	1.14
13	43.36	41.62	38.30	42.02	39.29	2.03	0.85	1.53	4.25	0.66
14	39.04	45.84	38.30	46.89	35.38	1.65	7.37	1.88	10.08	7.99
15	44.25	40.96	38.68	40.46	39.94	6.67	0.28	3.61	0.30	0.84
16	44.85	43.15	44.93	43.44	37.63	8.32	4.70	7.69	4.78	0.51
17	50.05	47.27	46.76	44.59	43.72	12.70	5.94	4.78	1.60	2.02
18	45.74	57.74	47.67	43.51	51.51	6.33	14.73	1.14	1.14	10.25
MAX	50.05	57.74	47.67	46.89	51.51	12.70	14.73	7.69	10.08	15.16
MIN	35.06	35.62	37.32	36.84	35.38	0.40	0.28	0.63	0.30	0.18
Aver	41.64	40.17	41.24	40.68	40.58	4.52	3.22	3.02	3.20	4.22

Group D

NO.	Initial					After Durability(precondition)					△ LLCR				
	D-1	D-2	D-3	D-4	D-5	D-1	D-2	D-3	D-4	D-5	D-1	D-2	D-3	D-4	D-5
1	38.24	35.96	33.52	31.69	37.53	34.60	44.54	34.01	38.67	36.42	3.64	8.58	0.49	6.98	1.11
2	35.97	36.34	34.24	42.53	34.43	39.16	32.58	36.86	34.75	42.36	3.18	3.77	2.62	7.78	7.93
3	35.80	37.10	35.08	35.44	36.15	39.65	36.80	37.12	45.11	38.11	3.84	0.29	2.04	9.67	1.96
4	37.06	36.56	42.02	35.97	42.54	43.53	42.31	41.19	34.07	35.73	6.47	5.75	0.83	1.90	6.81
5	37.39	38.96	36.38	36.96	38.43	43.01	42.31	44.96	41.52	39.48	5.62	3.35	8.58	4.57	1.05
6	36.47	38.21	36.59	35.85	42.44	32.63	33.89	35.03	41.95	39.46	3.85	4.32	1.57	6.10	2.98
7	37.41	37.99	37.04	43.29	36.61	44.45	43.96	39.68	34.76	30.93	7.04	5.96	2.64	8.53	5.68
8	35.43	36.80	42.76	42.12	40.25	37.74	37.47	34.06	32.17	36.98	2.30	0.68	8.70	9.95	3.27
9	40.65	37.63	32.95	37.91	33.15	35.66	35.97	39.08	34.28	39.46	4.99	1.66	6.13	3.63	6.31
10	41.99	41.08	43.02	36.26	32.30	38.96	43.45	34.50	40.43	41.04	3.03	2.37	8.52	4.18	8.74
11	33.35	47.07	33.15	32.93	41.91	32.78	31.33	44.16	39.63	35.93	0.57	15.75	11.01	6.70	5.98
12	29.67	44.84	38.81	36.07	41.31	37.07	32.41	32.75	40.61	33.93	7.40	12.43	6.06	4.54	7.38
13	29.67	40.58	33.92	31.84	42.97	33.89	39.53	37.37	43.63	43.22	4.22	1.05	3.45	11.79	0.25
14	34.46	44.72	36.81	44.44	43.35	32.49	33.13	42.39	40.20	43.47	1.97	11.58	5.59	4.25	0.12
15	28.20	43.14	32.94	37.41	44.00	41.92	43.45	38.82	41.35	43.00	13.72	0.31	5.89	3.95	1.00
16	28.84	47.89	39.25	32.16	44.86	31.33	35.94	35.90	43.24	43.01	2.49	11.95	3.35	11.08	1.85
17	45.68	41.10	45.14	42.67	44.51	45.06	42.58	40.58	47.06	42.65	0.62	1.49	4.57	4.39	1.86
18	46.82	48.61	43.25	41.16	40.37	45.94	45.02	40.68	42.16	45.16	0.88	3.59	2.57	1.00	4.79
MAX	46.82	48.61	45.14	44.44	44.86	45.94	45.02	44.96	47.06	45.16	13.72	15.75	11.01	11.79	8.74
MIN	28.20	35.96	32.94	31.69	32.30	31.33	31.33	32.75	32.17	30.93	0.57	0.29	0.49	1.00	0.12
Aver	36.28	40.81	37.60	37.59	39.84	38.32	38.70	38.28	39.75	39.46	4.21	5.27	4.70	6.17	3.84
Stdev	5.31	4.25	4.08	4.18	3.98	4.82	4.82	3.60	4.19	3.88	3.15	4.80	3.04	3.10	2.87

PRODUCT RELIABILITY TEST REPORT

Report No. GL-SZ20130916-02

GL-P-027-005

NO.	After Durability					△ LLCR				
	D-1	D-2	D-3	D-4	D-5	D-1	D-2	D-3	D-4	D-5
1	40.95	35.38	44.64	32.27	38.57	2.71	0.57	11.12	0.57	1.04
2	43.84	40.41	41.37	31.19	37.44	7.87	4.06	7.13	11.34	3.02
3	36.79	35.90	31.06	34.79	31.02	0.98	1.19	4.02	0.65	5.13
4	43.51	36.47	37.72	42.14	33.46	6.46	0.09	4.31	6.17	9.08
5	42.91	36.66	41.62	38.88	43.52	5.52	2.30	5.24	1.93	5.09
6	43.37	32.00	43.39	40.48	33.31	6.90	6.21	6.80	4.63	9.14
7	34.19	39.99	44.54	34.96	30.81	3.22	2.00	7.51	8.33	5.79
8	40.47	34.66	39.51	34.42	34.85	5.04	2.14	3.26	7.70	5.39
9	35.96	39.37	37.35	37.83	41.68	4.69	1.74	4.40	0.08	8.53
10	34.01	45.06	32.07	44.96	36.80	7.98	3.98	10.95	8.71	4.50
11	42.21	35.95	41.16	35.09	41.89	8.86	11.12	8.01	2.16	0.02
12	43.00	36.49	33.11	34.64	35.87	13.33	8.35	5.70	1.43	5.44
13	44.60	38.43	39.48	39.58	39.37	14.93	2.15	5.56	7.75	3.61
14	36.69	40.83	40.89	40.36	31.48	2.24	3.88	4.09	4.09	11.88
15	42.74	38.50	42.06	43.43	36.75	14.54	4.65	9.13	6.03	7.26
16	42.88	37.87	43.56	42.57	34.18	14.04	10.02	4.31	10.41	10.68
17	45.08	20.13	43.58	45.18	40.07	0.60	20.97	1.57	2.51	4.44
18	41.26	40.62	45.12	42.51	40.73	5.56	7.99	1.87	1.35	0.36
MAX	45.08	45.06	45.12	45.18	43.52	14.93	20.97	11.12	11.34	11.88
MIN	34.01	20.13	31.06	31.19	30.81	0.60	0.09	1.57	0.08	0.02
Aver	40.80	36.93	40.12	38.63	36.77	6.97	5.19	5.83	4.77	5.58
Stdev	3.61	5.11	4.33	4.39	3.94	4.61	5.11	2.76	3.63	3.38

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 -

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including performance and processing data.

CLICK TO CONTINUE

The information presented on the UL Prospector datasheet was acquired by UL Prospector from the producer of the material. UL Prospector makes substantial efforts to assure the accuracy of this data. However, UL Prospector assumes no responsibility for the data values and strongly encourages that upon final material selection, data points are validated with the material supplier.

Component - Plastics**E249884**[\[guide info\]](#)**SUMITOMO CHEMICAL CO LTD**

ADVANCED POLYMERS 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

	Min Thk	Flame			RTI	RTI	RTI
Color	(mm)	Class	HWI	HAI	Elec	Imp	Str
NC, BK	0.100	V-0	-	-	130	130	130
	0.200	V-0	4	1	130	130	130
	0.38	V-0	4	1	130	130	130
	0.75	V-0	4	1	130	130	130
	3.0	V-0	4	0	130	130	130

Comparative Tracking Index (CTI): 3

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 (%): -

Virgin and regrind material up to 70% by weight have the same V-0 flammability characteristics. No other properties have (r5) - 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: 2017-03-30

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**IEC and ISO Test Methods**

Test Name	Test Method	Units	Thk (mm)	Value
Flammability	IEC 60695-11-10	Class (color)	0.100	V-0 (NC, BK)
			0.200	V-0 (NC, BK)
			0.38	V-0 (NC, BK)
			0.75	V-0 (NC, BK)
			3.0	V-0 (NC, BK)
Glow-Wire Flammability (GWFI)	IEC 60695-2-12	°C	0.200	960
			0.38	960
			0.75	960
Glow-Wire Ignition (GWIT)	IEC 60695-2-13	°C	0.200	850
			0.38	850
			0.75	875
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	-	-

Test Report

No. SHAEC1711256102

Date: 06 Jun 2017

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SHANGHAI YIKANG CHEMICALS&INDUSTRIES CO.,LTD

RM2501-2502 ZHONGYINHUILONG BUILDING,#8 SUZHOU AVENUE WEST,SSZHOU INDUSTRIAL PARK.215021 CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : Sumitomo LCP SV6808THF BK

SGS Job No. : SP17-018118 - SH

Model No. : LCP

Material No. : SV6808THF BK

Date of Sample Received : 01 Jun 2017

Testing Period : 01 Jun 2017 - 03 Jun 2017

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 Cadmium, Lead, Mercury, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) 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
Approved Signatory



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Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

3rd Building, No. 889 Yishan Road Xuhui District, Shanghai China 200233
中国·上海·徐汇区宜山路889号3号楼 邮编: 200233

tE&E (86-21) 61402553 fE&E (86-21) 64953679 www.sgs.com.cn
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Test Report

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Date: 06 Jun 2017

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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA17-112561.001	Black solid pellet

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 ICP-OES.
 - (3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.
 - (4) With reference to IEC 62321-7-2:2017, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis and/or with reference to IEC 62321-5:2013, determination of Chromium by ICP-OES.
 - (5) With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.
 - (6) With reference to IEC 62321-8:2017, determination of phthalates by GC-MS.

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))	1000	mg/kg	8	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND



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Test Report

No. SHAEC1711256102

Date: 06 Jun 2017

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Test Item(s)	Limit	Unit	MDL	001
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND
Di-butyl Phthalate (DBP)	1000	mg/kg	50	ND
Benzyl Butyl Phthalate (BBP)	1000	mg/kg	50	ND
Di-2-Ethyl Hexyl Phthalate (DEHP)	1000	mg/kg	50	ND
Diisobutyl Phthalates (DIBP)	1000	mg/kg	50	ND

Notes :

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863. IEC 62321 series is equivalent to EN 62321 series
http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25
- (2) The result of Hexavalent Chromium (Cr(VI)) is deemed to be "ND" since the result of total chromium content is "ND", so testing of Hexavalent Chromium (Cr(VI)) is not required.
- (3) If the Chromium (Cr) content is greater than the MDL of Hexavalent Chromium (Cr(VI)), confirmation test of Hexavalent Chromium (Cr(VI)) is required.
- (4) On 4 June 2015, Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP, DBP, DEHP and DIBP into ANNEX II of the Rohs Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.
- (5) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.
- (6) The restriction of DEHP, BBP, DBP and DIBP shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of EEE placed on the market before 22 July 2019, and of medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, placed on the market before 22 July 2021.
- (7) The restriction of DEHP, BBP and DBP shall not apply to toys which are already subject to the restriction of DEHP, BBP and DBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

Halogen



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Test Report

No. SHAEC1711256102

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Test Method : With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Fluorine (F)	mg/kg	50	307
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

Remark:

The test results are taken from report SHAEC1711256101.



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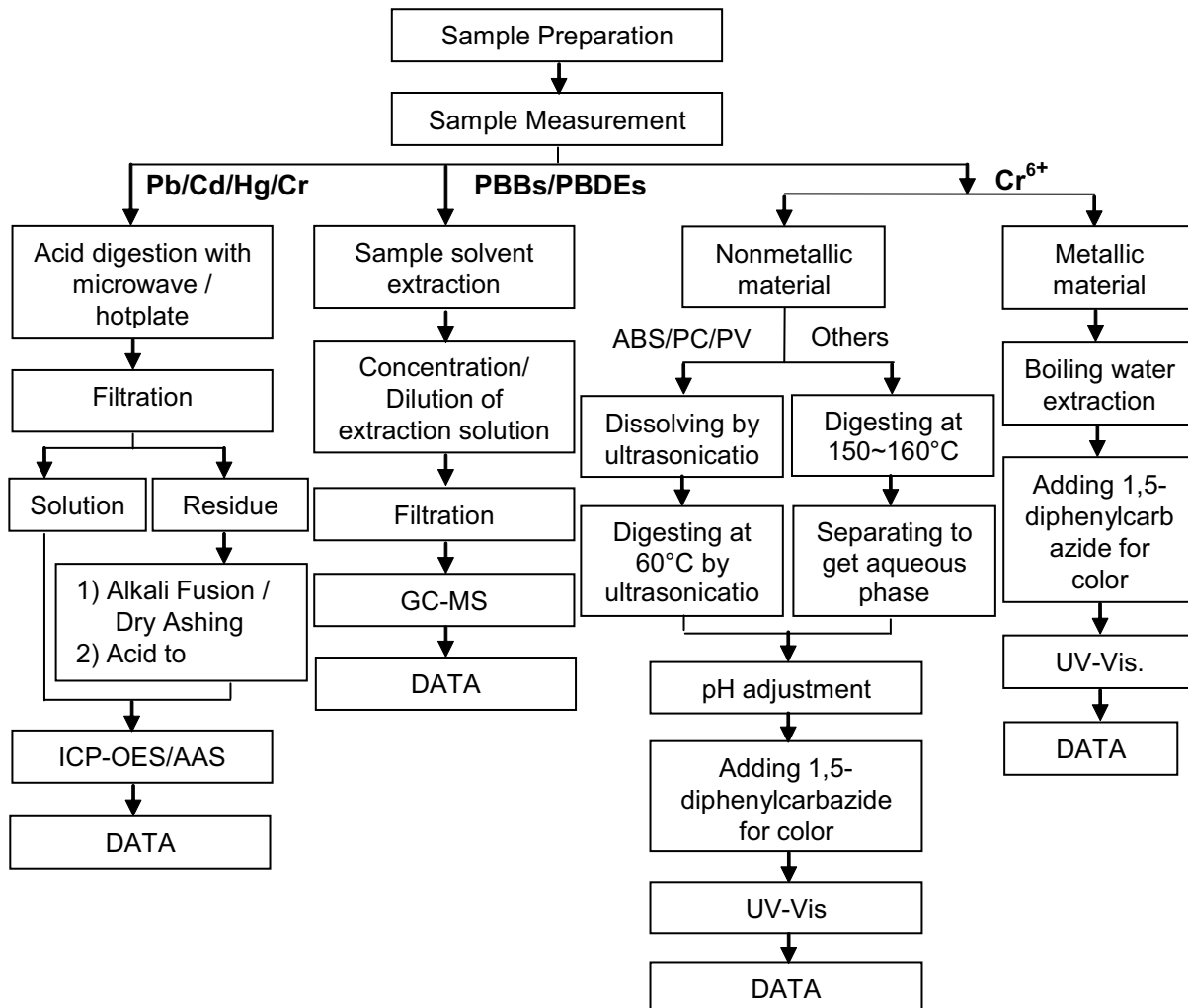
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ATTACHMENTS

RoHS Testing Flow Chart

- 1) Name of the person who made testing: Meria Jin/Gary Xu/Sean Li/Sielina Song
- 2) Name of the person in charge of testing: Jan Shi/Jessy Huang/Luna Xu/Shara Wang
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ and PBBs/PBDEs test method excluded)



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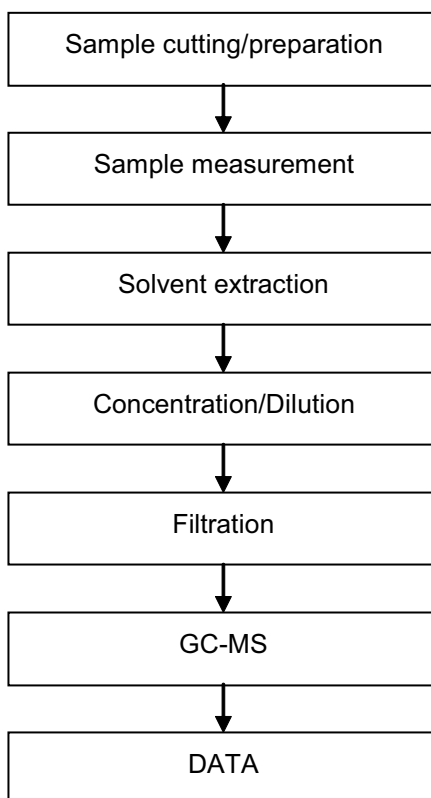
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ATTACHMENTS

Phthalates Testing Flow Chart

- 1) Name of the person who made testing: Sherlock Gao
- 2) Name of the person in charge of testing: Jessy Huang



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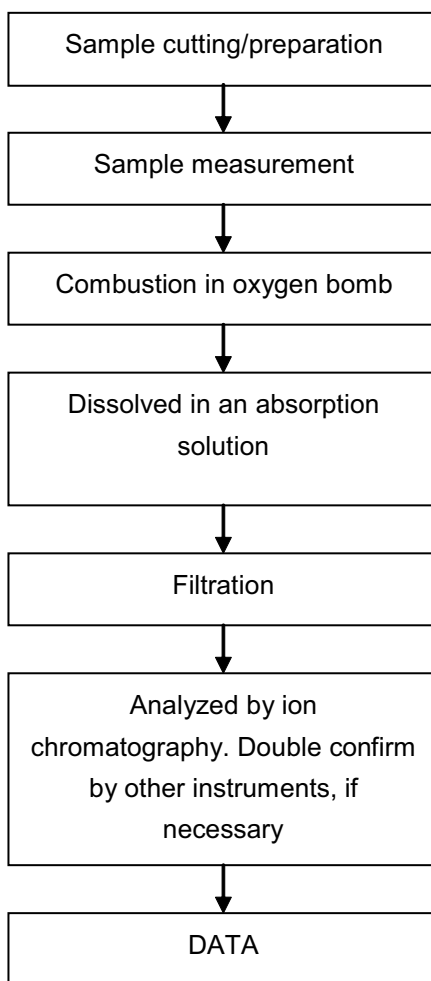
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ATTACHMENTS

Halogen Testing (oxygen bomb) Flow Chart

- 1) Name of the person who made testing: Kevin Xu
- 2) Name of the person in charge of testing: Sisily Yin



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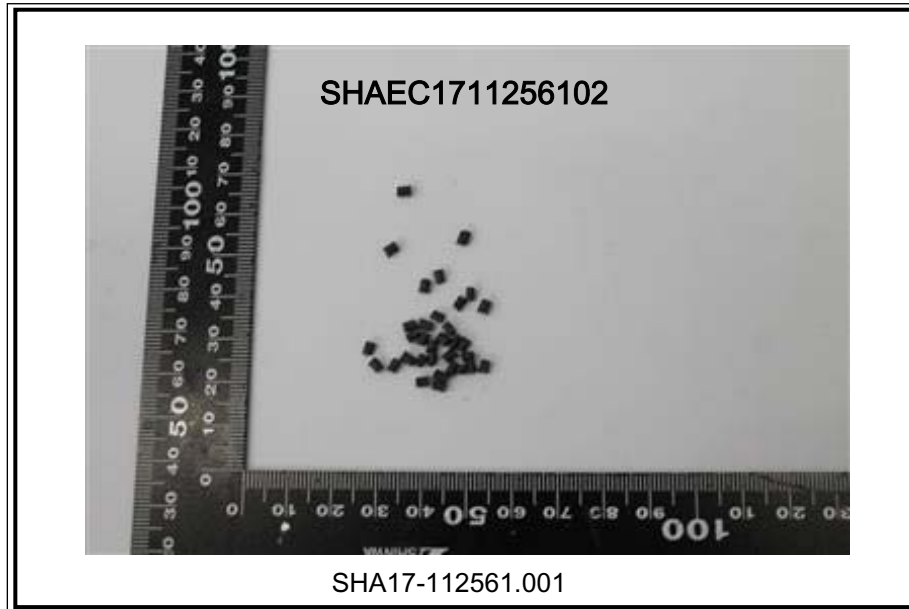
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No. SHAEC1711256102

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Sample photo:



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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:	378759 / 1
Order No/Ref:	PO000366B	Alloy - Temper:	1065 - 95
Mark:		Norm Specification:	
Part No:		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

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Test Report

Report No. ECL01J012504001

Page 1 of 5

Applicant AURUBIS METAL PRODUCTS (SHANGHAI) CO.,LTD
Address PART A,1F,NO.211,FUTE RD(N),WAIGAOQIAO FREE TRADE
ZONE,SHANGHAI,200131

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
Supplier Aurubis Netherlands BV
Buyer LOTES Suzhou CO.,LTD
Sample Received Date Mar. 9, 2017
Testing Period Mar. 9, 2017 to Mar. 13, 2017

Test Requested As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs) 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

Pass means that the results shown on the report comply with the limits set by RoHS Directive 2011/65/EU.



Tested by

Approved by

Su Hongwei
Su Hongwei

Senior Laboratory Manager

Centre Testing International Pimbiao(Shanghai) Co., Ltd.

Reviewed by

Date

Taoying
Mar. 13, 2017

No. T172793908

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

Test Report

Report No. ECL01J012504001

Page 2 of 5

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
Polybrominated Biphenyls(PBBs)	IEC 62321-6:2015	GC-MS
Polybrominated Diphenyl Ethers(PBDEs)	IEC 62321-6:2015	GC-MS

Test Result(s)

Tested Item(s)	Result	MDL	Limit of Directive 2011/65/EU
Lead (Pb)	19 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))	N.D. ▼	0.10 µg/cm ² (LOQ)	1000 mg/kg

Tested Item(s)	Result	MDL	Limit of Directive 2011/65/EU
Polybrominated Biphenyls(PBBs)			
Monobromobiphenyl	N.D.	5 mg/kg	1000 mg/kg
Dibromobiphenyl	N.D.	5 mg/kg	
Tribromobiphenyl	N.D.	5 mg/kg	
Tetrabromobiphenyl	N.D.	5 mg/kg	
Pentabromobiphenyl	N.D.	5 mg/kg	
Hexabromobiphenyl	N.D.	5 mg/kg	
Heptabromobiphenyl	N.D.	5 mg/kg	
Octabromobiphenyl	N.D.	5 mg/kg	
Nonabromobiphenyl	N.D.	5 mg/kg	
Decabromobiphenyl	N.D.	5 mg/kg	

Test Report

Report No. ECL01J012504001

Page 3 of 5

Tested Item(s)	Result	MDL	Limit of Directive 2011/65/EU
Polybrominated Diphenyl Ethers(PBDEs)			
Monobromodiphenyl ether	N.D.	5 mg/kg	1000 mg/kg
Dibromodiphenyl ether	N.D.	5 mg/kg	
Tribromodiphenyl ether	N.D.	5 mg/kg	
Tetrabromodiphenyl ether	N.D.	5 mg/kg	
Pentabromodiphenyl ether	N.D.	5 mg/kg	
Hexabromodiphenyl ether	N.D.	5 mg/kg	
Heptabromodiphenyl ether	N.D.	5 mg/kg	
Octabromodiphenyl ether	N.D.	5 mg/kg	
Nonabromodiphenyl ether	N.D.	5 mg/kg	
Decabromodiphenyl ether	N.D.	5 mg/kg	

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 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.

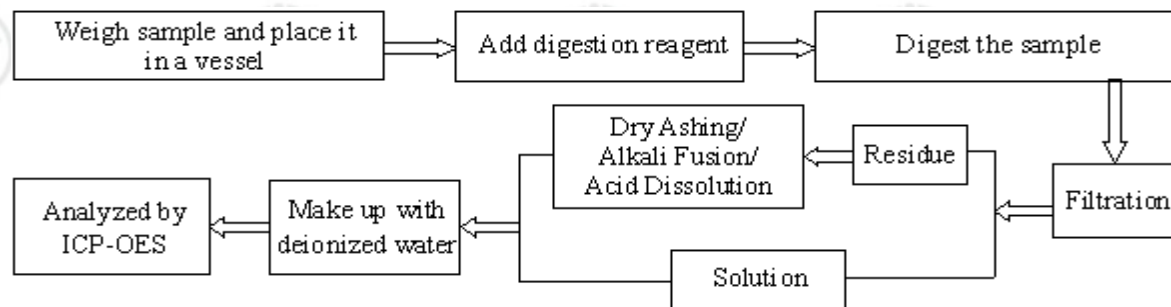
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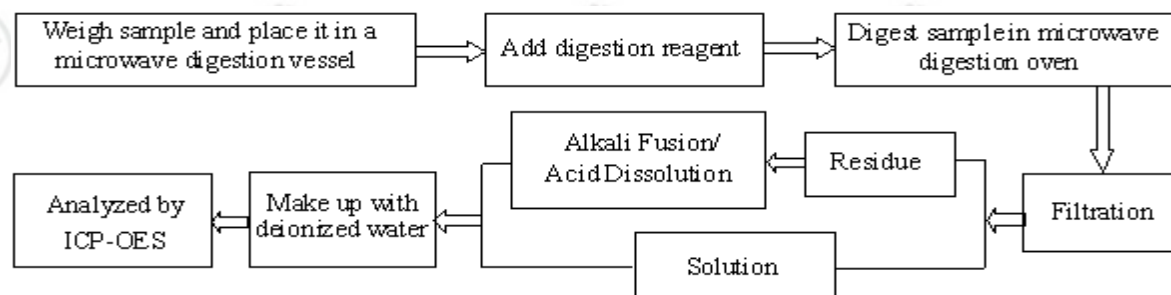
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Test Process

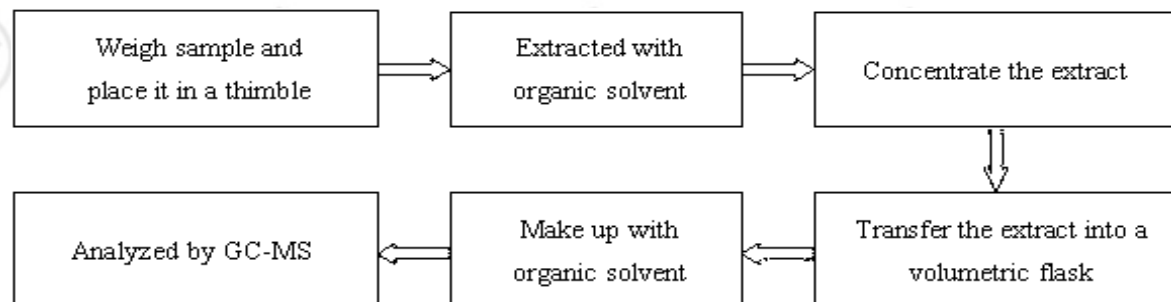
1. Lead (Pb), Cadmium (Cd)



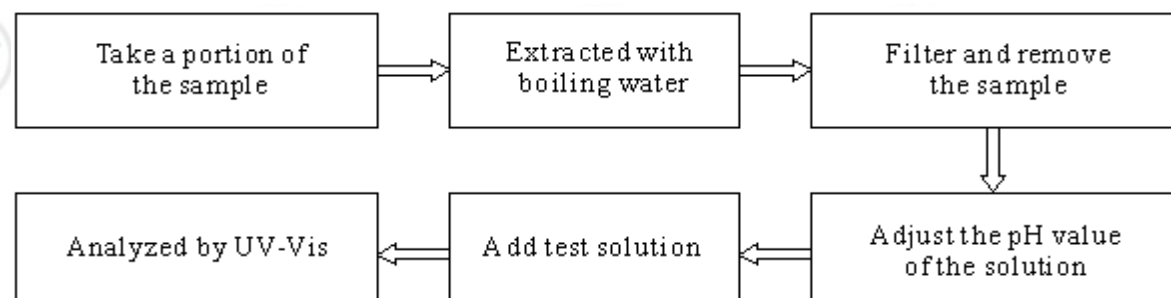
2. Mercury (Hg)



3. Polybrominated Biphenyls(PBBs) , Polybrominated Diphenyl Ethers(PBDEs)



4. Hexavalent Chromium(Cr(VI))

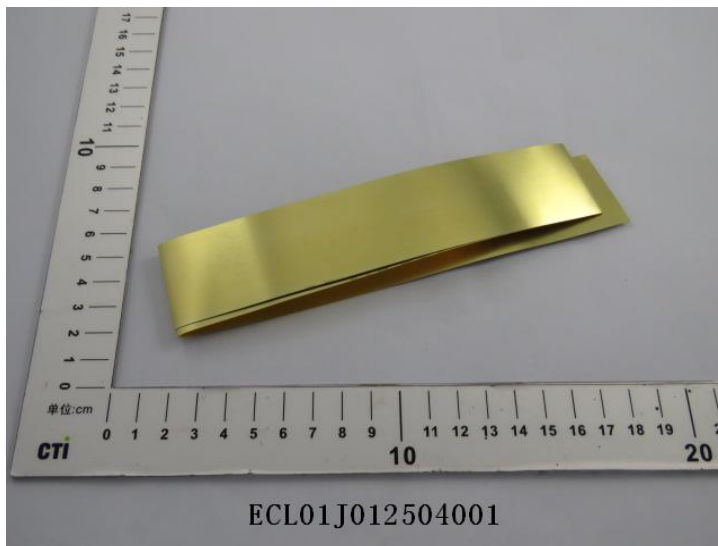


Test Report

Report No. ECL01J012504001

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Photo(s) of the sample(s)



*** End of report ***

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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	20110830001	開立日期 Issue Date	2011-8-30	證明書編號 Certificate No	201108300 01						
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		0.2	13	COIL	1C	样品										
2				COIL												
3				COIL												
4				COIL												
5				COIL												
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 Bend Test
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						20110830001	155	375	630	14	OK
2																
3																
4																
5																
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Test Report

No. SHAEC1714114905

Date: 05 Jul 2017

Page 1 of 4

KUNSHAN RUIHUADA PRECISION ELECTRONIC MATERIAL CO.,LTD
NO.889, WEST ZHENXIN ROAD, ZHANGPU TOWN, KUNSHAN CITY

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

SGS Job No. : SP17-023598 - SH

Model No. : S50C

Date of Sample Received : 03 Jul 2017

Testing Period : 03 Jul 2017 - 05 Jul 2017

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
Approved Signatory



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Test Report

No. SHAEC1714114905

Date: 05 Jul 2017

Page 2 of 4

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA17-141149.003	Silvery metal plate

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 62321-7-1:2015 , determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.

Test Item(s)	Limit	Unit	MDL	003
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))▼	-	µg/cm ²	0.10	ND

Notes :

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
 IEC 62321 series is equivalent to EN 62321 series
http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25
- (2) ▼= a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm². The sample coating is considered to contain CrVI
 b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm²). The coating is considered a non-CrVI based coating
 c. The result between 0.10 µg/cm² and 0.13 µg/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination

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.

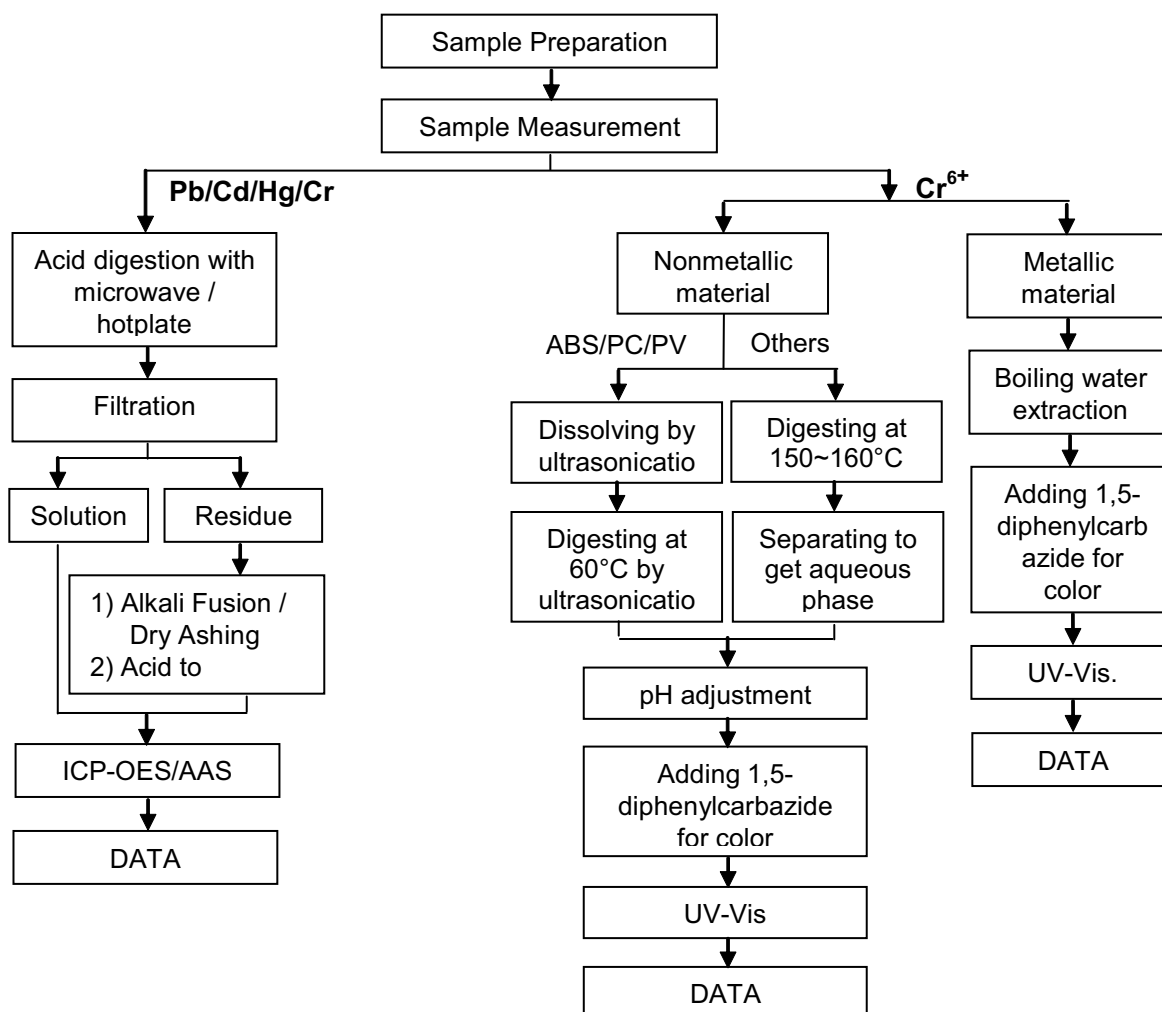


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ATTACHMENTS

Pb/Cd/Hg/Cr⁶⁺ Testing Flow Chart

- 1) Name of the person who made testing: Meria Jin/Gary Xu/Sean Li/Sielina Song
- 2) Name of the person in charge of testing: Jan Shi/Jessy Huang/Luna Xu/Shara Wang
- 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. SHAEC1714114905

Date: 05 Jul 2017

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Sample photo:



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检测报告 Test Report

报告编号 ECL01J065286002E
Report No. ECL01J065286002E

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 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Ni Au
Sample Name
材料名称 C1065
Material
样品接收日期 2017.10.18
Sample Received Date Oct. 18, 2017
样品检测日期 2017.10.18-2017.10.23
Testing Period Oct. 18, 2017 to Oct. 23, 2017

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 王东
Tested by

批 准 苏红伟
Approved by



实验室高级经理 Senior Laboratory Manager

上海华测品标检测技术有限公司
Centre Testing International Pinbiao(Shanghai) Co., Ltd.
检验检测专用章
Inspection & Testing Services

审 核 董拥民
Reviewed by
日 期 2017.10.23
Date

No. R198691131

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 ECL01J065286002E
Report No. ECL01J065286002E

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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)	N.D.	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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测试样品 / 部位描述 银色 / 金色镀层
Tested Sample/Part Description Silvery/golden 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.

注释: 本报告中的数据结果供科研、教学、企业内部质量控制、企业产品研发等目的用。
“*” 表示该方法不在CNAS认可范围内。

Note: **The testing data and result(s) in this report is(are) just for scientific research, education, internal quality control and product development etc.**
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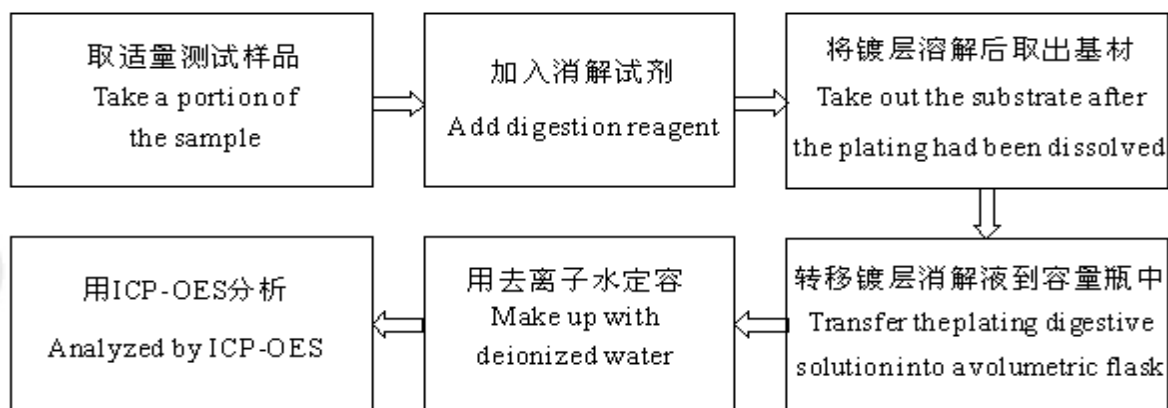
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报告编号 ECL01J065286002E
Report No. ECL01J065286002E

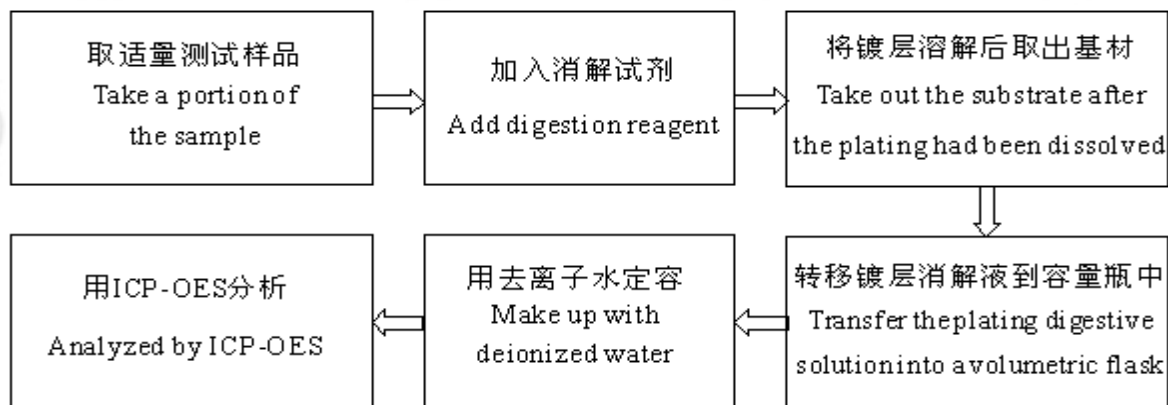
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检测流程 Test Process

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



2. 汞(Hg) Mercury (Hg)

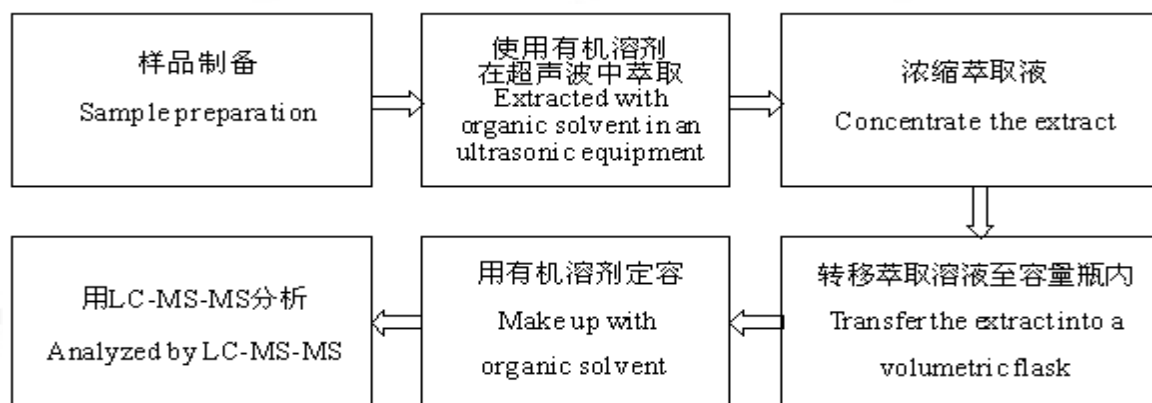


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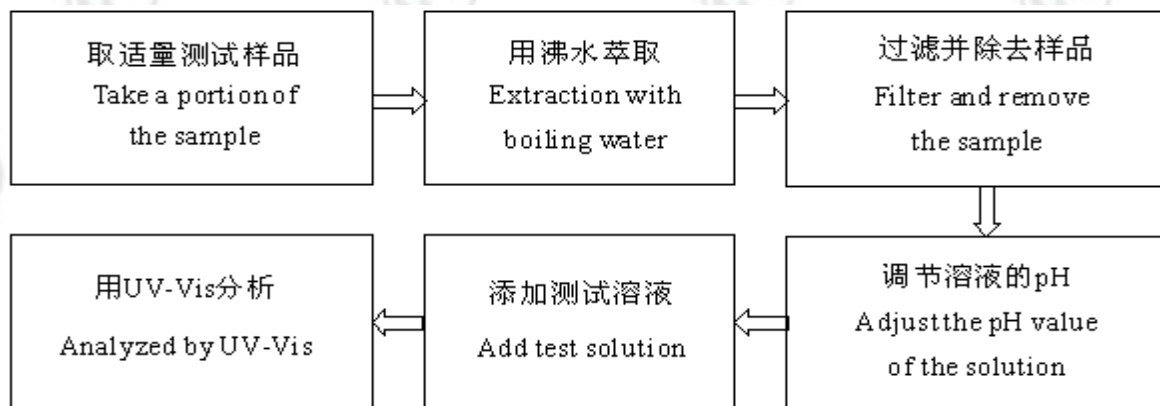
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Report No. ECL01J065286002E

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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))

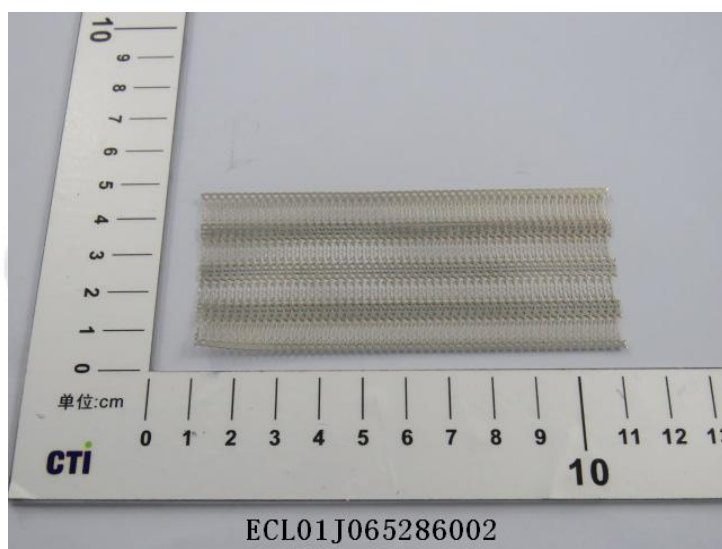


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Report No. ECL01J065286002E

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样品图片 Photo(s) of the sample(s)



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*** End of report ***

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报告编号 ECL01J065286001E
Report No. ECL01J065286001E

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 鍍層Ni Sn
Sample Name
材料名称 S50C
Material
样品接收日期 2017.10.18
Sample Received Date Oct. 18, 2017
样品检测日期 2017.10.18-2017.10.23
Testing Period Oct. 18, 2017 to Oct. 23, 2017

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)),
全氟辛烷磺酸盐(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 王东
Tested by

批 准 苏红伟
Approved by



实验室高级经理 Senior Laboratory Manager

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

审 核 董拥民
Reviewed by
日 期 2017.10.23
Date

No. R198691131

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 ECL01J065286001E
Report No. ECL01J065286001E

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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 62321-7-1:2015	UV-Vis
全氟辛烷磺酸盐(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)	14 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
全氟辛烷磺酸盐(PFOS) Perfluorooctane Sulfonates(PFOS)	N.D.	0.5 µg/m ²

检测报告 Test Report

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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.

注释: 本报告中的数据结果供科研、教学、企业内部质量控制、企业产品研发等目的用。
“*” 表示该方法不在CNAS认可范围内。

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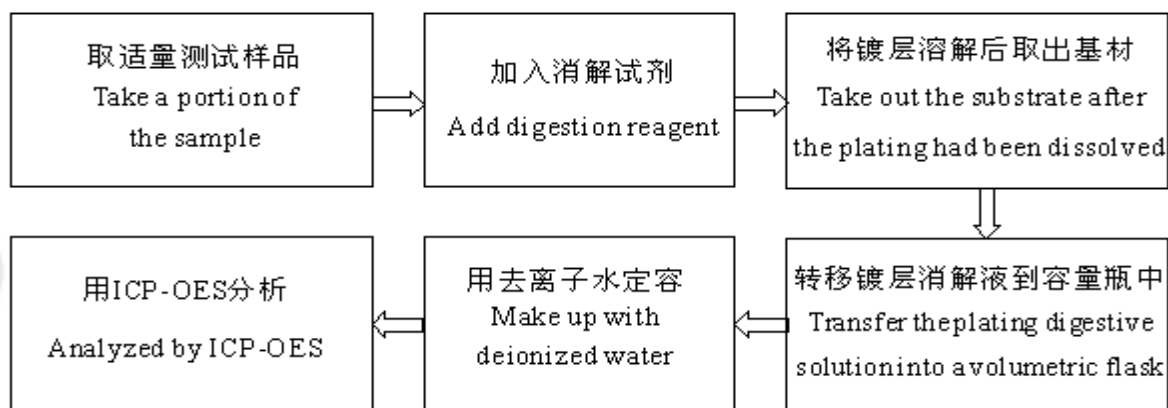
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Report No. ECL01J065286001E

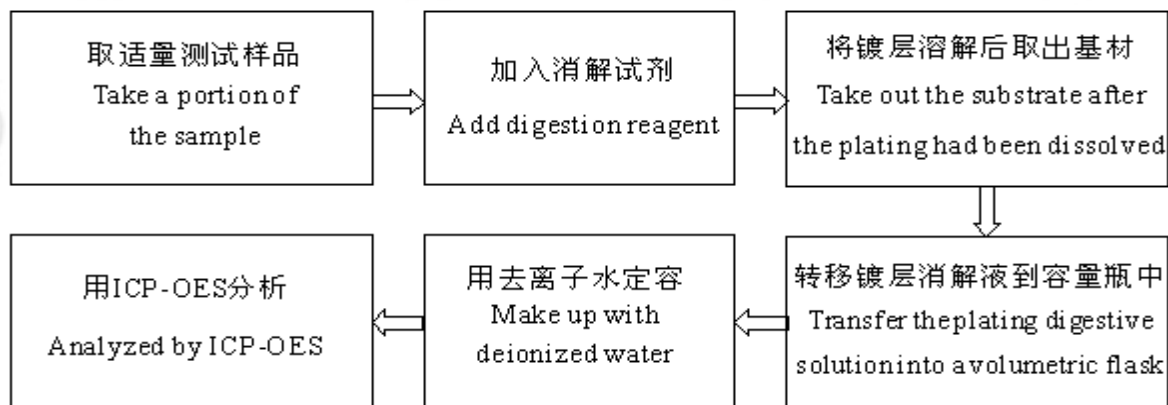
第 4 页 共 6 页
Page 4 of 6

检测流程 Test Process

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



2. 汞(Hg) Mercury (Hg)

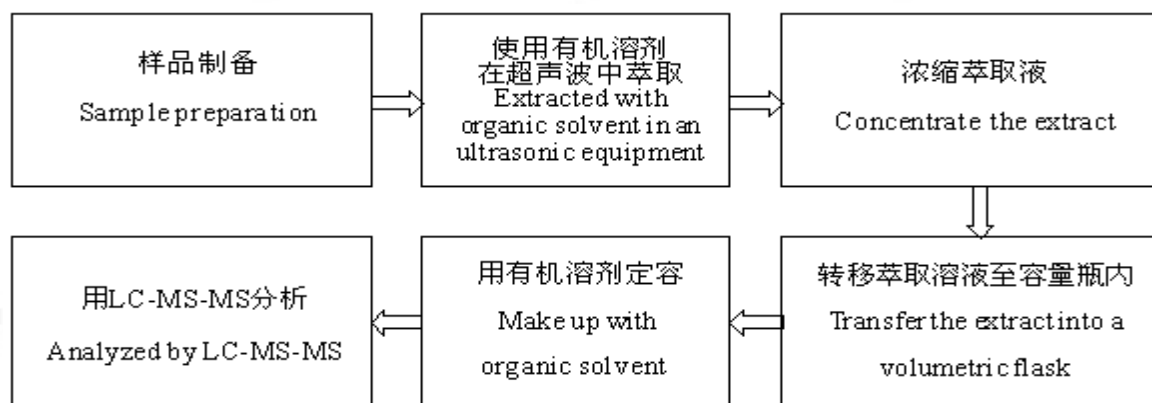


检测报告 Test Report

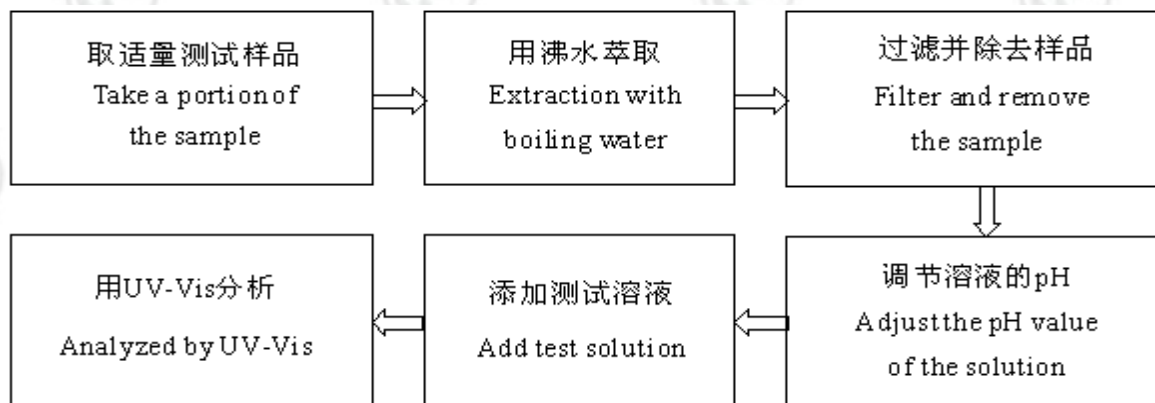
报告编号 ECL01J065286001E
Report No. ECL01J065286001E

第 5 页 共 6 页
Page 5 of 6

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



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

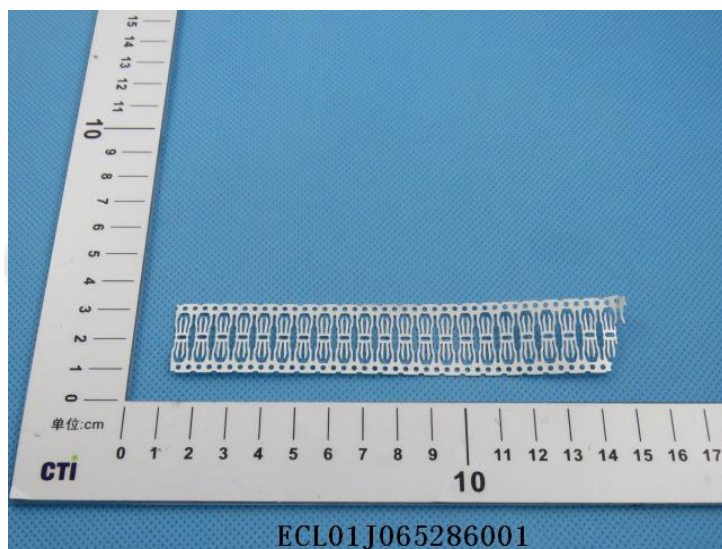


检测报告 Test Report

报告编号 ECL01J065286001E
Report No. ECL01J065286001E

第 6 页 共 6 页
Page 6 of 6

样品图片 Photo(s) of the sample(s)



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*** End of report ***

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