Form No: T00117-2-0000-KBM01-250400370

Specification for Approval

Date: 2024/04/12

Halogen-free RoHS

Customer : 鈺緯科技

TAI-TECH P/N: HCB1608KF-601T20

CUSTOMER P/N: 3LFBC00811Y (L0203)

DESCRIPTION:

QUANTITY: pcs

REMARK:

Customer Approval Feedback

設計驗證
工程課
2025 -04- 22
發行
鈺緯科技開發股份有限公司

西 北 臺 慶 科 技 股 份 有 限 公 司
TAI-TECH Advanced Electronics Co., Ltd

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High Current Ferrite Chip Bead(Lead Free) HCB1608KF-601T20

ECN HISTORY LIST

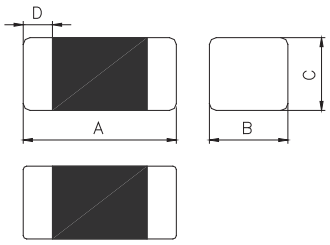
REV	DATE	DESCRIPTION	APPROVED	CHECKED	DRAWN
1.0	13/06/06	變更可靠度條件	楊祥忠	羅培君	張嘉玲
2.0	14/01/24	變更電鍍錫層厚度 3.0um min.=>3.5um min.	楊祥忠	羅培君	張嘉玲
3.0	14/08/01	變更 Reflow 圖示	楊祥忠	羅培君	張嘉玲
3.1	14/08/01	修正包裝帶尺寸	楊祥忠	羅培君	張嘉玲
4.0	14/10/13	訂正 1608 包裝帶 Ao 尺寸	楊祥忠	羅培君	張嘉玲
5.0	16/01/26	增訂可靠度 Thermal shock: (Bead) Step3：125±2℃ 30±5min	楊祥忠	詹偉特	張嘉玲
6.0	17/02/16	修訂 Recommended PC Board Pattern	楊祥忠	詹偉特	張嘉玲
7.0	20/08/01	更新 Reflow 依 IPC EDEC J-STD-020E	鄧福興	浦冬生	王俞琴
8.0	22/12/05	更新可靠度及更正 Reflow 敘述	鄧福興	浦冬生	王俞琴
備註					

High Current Ferrite Chip Bead(Lead Free) HCB1608KF-601T20

1.Features

1. Monolithic inorganic material construction.
2. Closed magnetic circuit avoids crosstalk.
3. Suitable for reflow soldering.
4. Shapes and dimensions follow E.I.A. spec.
5. Available in various sizes.
6. Excellent solder ability and heat resistance.
7. High reliability.
8. 100% Lead(Pb) & Halogen-Free and RoHS compliant.
9. Low DC resistance structure of electrode to prevent wasteful electric power consumption.
10. Operating Temperature: -55~+125℃(Including self-temperature rise)

2.Dimensions



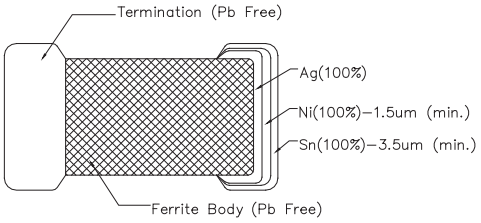
Chip Size	
A	1.60±0.15
B	0.80±0.15
C	0.80±0.15
D	0.30±0.20

Units: mm

3.Part Numbering

HCB	1608	KF	-	601	T	20
A	B	C		D	E	F

A: Series
B: Dimension L x W
C: Material Lead Free Material
D: Impedance 601=600Ω
E: Packaging T=Taping and Reel, B=Bulk(Bags)
F: Rated Current 20=2000mA

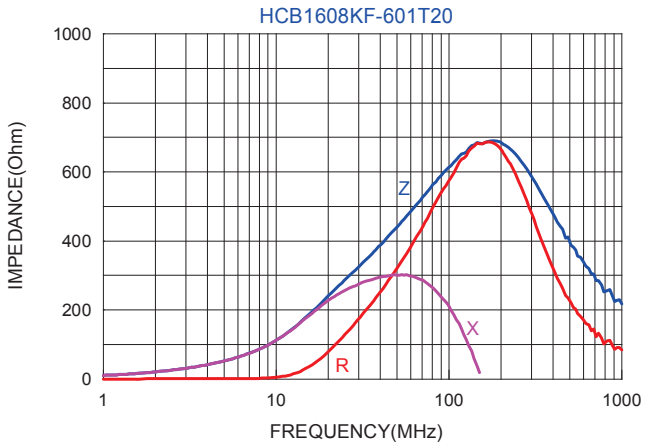


4.Specification

Tai-Tech Part Number	Impedance (Ω)	Test Frequency (Hz)	DC Resistance (Ω) max.	Rated Current (mA) max.
HCB1608KF-601T20	600±25%	60mV/100M	0.10	2000

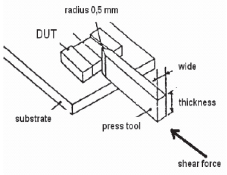
- Rated current: based on temperature rise test
- In compliance with EIA 595
- All test data referenced to 25℃ ambient

■ Impedance-Frequency Characteristics



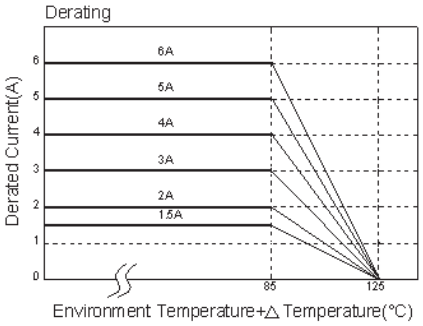
5. Reliability and Test Condition

Item	Performance					Test Condition
Series No.	FCB	FCM	HCB	GHB	FCA	--
Operating Temperature	-55~+125℃ (Including self-temperature rise)					--
Transportation Storage Temperature	-55~+125℃ (on board)					For long storage conditions, please see the Application Notice
Impedance (Z)	Refer to standard electrical characteristics list					Agilent4291 Agilent E4991 Agilent4287 Agilent16192
DC Resistance						Agilent 4338
Rated Current						DC Power Supply Over Rated Current requirements, there will be some risk
Temperature Rise Test	Rated Current < 1A ΔT 20℃Max Rated Current ≧ 1A ΔT 40℃Max					1. Applied the allowed DC current. 2. Temperature measured by digital surface thermometer.
Life test	Appearance: no damage. Impedance: within±15%of initial value. DCR：within ±15% of initial value and shall not exceed the specification value					Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020F Classification Reflow Profiles) Temperature: 125±2℃ Applied current: rated current. Duration: 1000±12hrs. Measured at room temperature after placing for 24±2 hrs.
Load Humidity						Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020F Classification Reflow Profiles) Humidity: 85±3%R.H. Temperature: 85±2℃. Duration:1000hrsMin.Bead:with100%ratedcurrent，Inductance: with 10% rated current Measured at room temperature after placing for 24±2 hrs..
Thermal shock	Appearance: no damage. Impedance: within±15%of initial value. DCR：within ±15% of initial value and shall not exceed the specification value					Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020F Classification Reflow Profiles) Condition for 1 cycle Step1: -55±2℃ 30±5 min. Step2: 125±2℃ ≦0.5min Step3: 125±2℃ 30±5min. Number of cycles: 500 Measured at room temperature after placing for 24±2 hrs.
Vibration	Appearance：No damage. Impedance：within±15% of initial value DCR：within ±15% of initial value and shall not exceed the specification value					Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020F Classification Reflow Profiles) Oscillation Frequency: 10Hz～2KHz～10Hz for 20 minutes Equipment： Vibration checker Total Amplitude:10g Testing Time：12 hours(20 minutes, 12 cycles each of 3 orientations)。
Bending	Appearance：No damage. Impedance：within±10% of initial value DCR：within ±15% of initial value and shall not exceed the specification value					Shall be mounted on a FR4 substrate of the following dimensions: >=0805inch(2012mm):40x100x1.2mm <0805inch(2012mm):40x100x0.8mm Bending depth: >=0805inch(2012mm):1.2mm <0805inch(2012mm):0.8mm Duration of 10 sec for a min.
Shock	Appearance：No damage. Impedance：within±10% of initial value DCR：within ±15% of initial value and shall not exceed the specification value					Preconditioning:Run through reflow for 3 times.(IPC/JEDEC J-STD-020F Classification Reflow Profiles Test condition: Type / Peak Value (g's) / Normal duration (D) (ms) / Wave form / Velocity change (Vi)ft/sec SMD / 50 / 11 / Half-sine / 11.3 Lead / 50 / 11 / Half-sine / 11.3 3 shocks in each direction along 3 perpendicular axes (18shocks).

Item	Performance	Test Condition
Solderability	More than 95% of the terminal electrode should be covered with solder.	a.Method B, 4 hrs @155°C dry heat @235°C±5°C Test time:5 +0/-0.5 seconds. b. Method D category 3. (steam aging 8hours ± 15 min)@ 260°C±5°C Test time: 30 +0/-0.5 seconds.
Resistance to Soldering Heat	Appearance：No damage. Impedance：within±15% of initial value DCR：within ±15% of initial value and shall not exceed the specification value	Number of heat cycles: 1 Temperature (°C) / Time (s) / Temperature ramp/immersion and emersion rate 260 ±5 (solder temp) / 10 ±1 / 25mm/s ±6 mm/s Depth: completely cover the termination
Terminal strength	Appearance：No damage. Impedance：within±15% of initial value DCR：within ±15% of initial value and shall not exceed the specification value 	Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020F Classification Reflow Profiles) Component mounted on a PCB apply a force >0805inch(2012mm):1kg <=0805inch(2012mm):0.5kg to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to shock the component being tested.

**Derating Curve

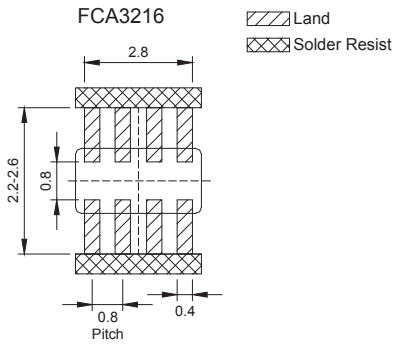
For the ferrite chip bead which withstanding current over 1.5A, as the operating temperature over 85℃, the derating current information is necessary to consider with. For the detail derating of current, please refer to the Derated Current vs. Operating Temperature curve.

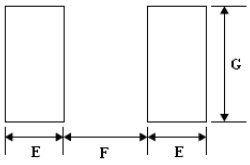


6.Soldering and Mounting

6-1. Recommended PC Board Pattern

Chip Size						Land Patterns For Reflow Soldering		
Series	**Type**	**A(mm)**	**B(mm)**	**C(mm)**	**D(mm)**	**E(mm)**	**F(mm)**	**G(mm)**
FCB	1005	1.0±0.10	0.50±0.10	0.50±0.10	0.25±0.10	0.50	0.40	0.60
FCM	1608	1.6±0.15	0.80±0.15	0.80±0.15	0.30±0.20	0.80	0.85	0.95
HCB	2012	2.0±0.20	1.25±0.20	0.85±0.20	0.50±0.30	1.05	1.00	1.45
GHB		2.0±0.20	1.25±0.20	1.25±0.20	0.50±0.30			
FCI	3216	3.2±0.20	1.60±0.20	1.10±0.20	0.50±0.30	1.05	2.20	1.80
FHI	3225	3.2±0.20	2.50±0.20	1.30±0.20	0.50±0.30	1.05	2.20	2.70
FCH	4516	4.5±0.20	1.60±0.20	1.60±0.20	0.50±0.30	1.05	3.30	1.80
HCI	4532	4.5±0.20	3.20±0.20	1.50±0.20	0.50±0.30	1.05	3.30	3.40





PC board should be designed so that products can prevent damage from mechanical stress when warping the board.

6-2. Soldering

Mildly activated rosin fluxes are preferred. TAI-TECH terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

6-2.1 Soldering Reflow:

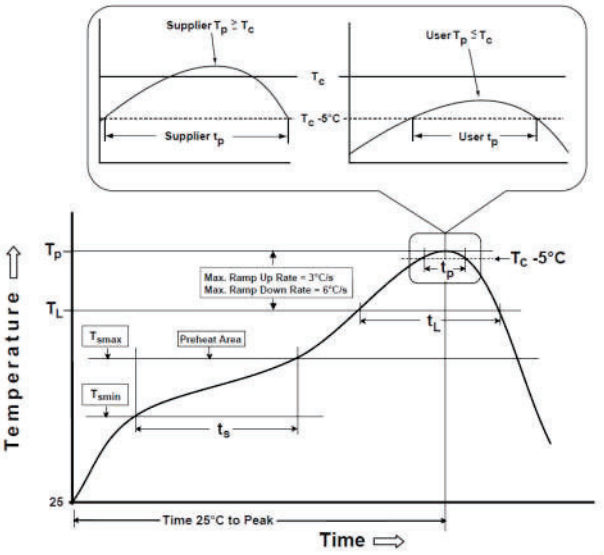
Recommended temperature profiles for lead free re-flow soldering in Figure 1. Table 1.1&1.2 (J-STD-020F)

6-2.2 Soldering Iron:

Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended. (Figure 2.)

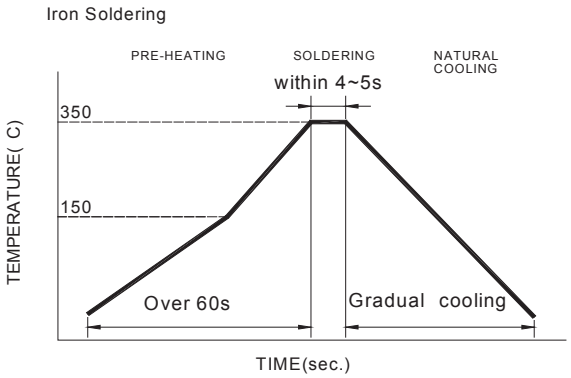
- Preheat circuit and products to 150℃
- 350℃ tip temperature (max)
- Never contact the ceramic with the iron tip
- 1.0mm tip diameter (max)
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- Limit soldering time to 4~5sec.

Fig.1 Soldering Reflow



Reflow times: 3 times max

Fig.2 Iron soldering temperature profiles



Iron Soldering times：1 times max

Table (1.1): Reflow Profiles

Profile Type:	Pb-Free Assembly
Preheat -Temperature Min(T_{smin}) -Temperature Max(T_{smax}) -Time(t_s)from(T_{smin} to T_{smax})	 150℃ 200℃ 60-120seconds
Ramp-up rate($T_L$to T_p)	3℃/second max.
Liquidus temperature(T_L) Time(t_L)maintained above T_L	217℃ 60-150 seconds
Classification temperature(T_c)	See Table (1.2)
Time(t_p) at Tc- 5℃ (Tp should be equal to or less than Tc.)	< 30 seconds
Ramp-down rate(T_p to T_L)	6℃ /second max.
Time 25℃ to peak temperature	8 minutes max.

Tp: maximum peak package body temperature, **Tc**: the classification temperature.

For user (customer) **Tp** should be equal to or less than **Tc.**

Table (1.2) Package Thickness/Volume and Classification Temperature (T_c)

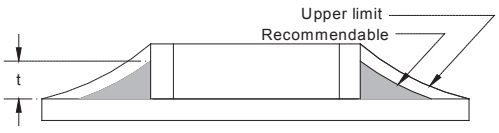
	Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
PB-Free Assembly	<1.6mm	260℃	260℃	260℃
	1.6-2.5mm	260℃	250℃	245℃
	≥2.5mm	250℃	245℃	245℃

Reflow is referred to standard IPC/JEDEC J-STD-020F。

6-2.3 Solder Volume:

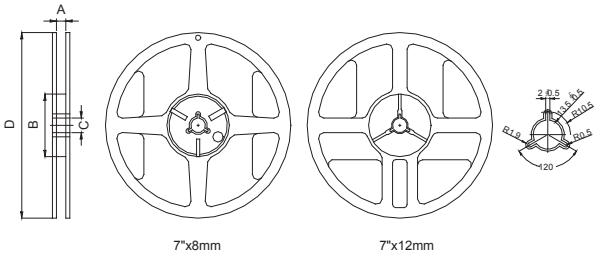
Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance. Solder shall be used not to be exceed as shown in right side:

Minimum fillet height = soldering thickness + 25% product height



7.Packaging Information

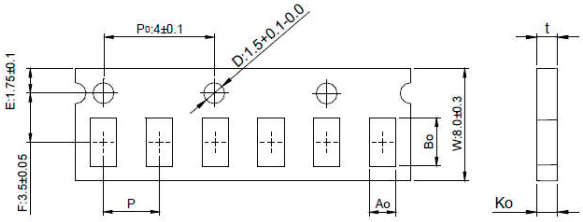
7-1. Reel Dimension



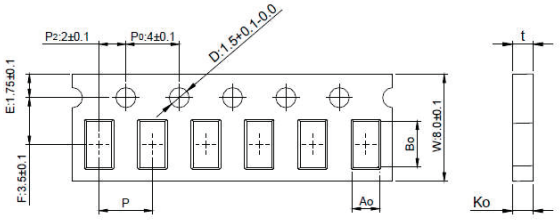
Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x8mm	9.0±0.5	60±2	13.5±0.5	178±2
7"x12mm	13.5±0.5	60±2	13.5±0.5	178±2

7-2.1 Tape Dimension / 8mm

■Material of taping is paper

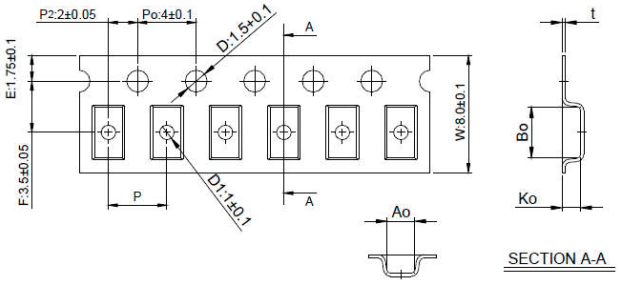


Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)
100505	1.12±0.03	0.62±0.03	0.60±0.03	2.0±0.05	0.60±0.03



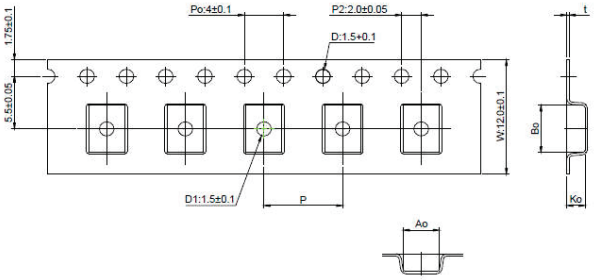
Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)
160808	1.80±0.05	0.96+0.05/-0.03	0.95±0.05	4.0±0.10	0.95±0.05
201209	2.10±0.05	1.30±0.05	0.95±0.05	4.0±0.10	0.95±0.05

■Material of taping is plastic



Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)	D1(mm)
201212	2.10±0.10	1.28±0.10	1.28±0.10	4.0±0.10	0.22±0.05	1.0±0.10
321611	3.35±0.10	1.75±0.10	1.25±0.10	4.0±0.10	0.23±0.05	1.0±0.10
322513	3.42±0.10	2.77±0.10	1.55±0.10	4.0±0.10	0.22±0.05	1.0±0.10
321609	3.40±0.10	1.77±0.10	1.04±0.10	4.0±0.10	0.22±0.05	1.0±0.10

7-2.2 Tape Dimension / 12mm

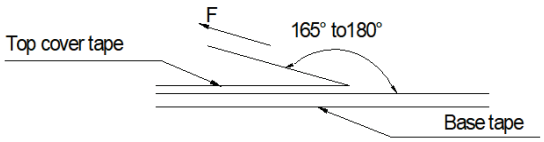


Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)	D1(mm)
451616	4.70±0.10	1.75±0.10	1.75±0.10	4.0±0.10	0.24±0.05	1.5±0.10
453215	4.70±0.10	3.45±0.10	1.60±0.10	8.0±0.10	0.24±0.05	1.5±0.10

7-3. Packaging Quantity

Chip Size	453215	451616	322513	321611	321609	201212	201209	160808	100505
Chip / Reel	1000	2000	2500	3000	3000	2000	4000	4000	10000
Inner box	4000	8000	12500	15000	15000	10000	20000	20000	50000
Middle box	20000	40000	62500	75000	75000	50000	100000	100000	250000
Carton	40000	80000	125000	150000	150000	100000	200000	200000	500000

7-4. Tearing Off Force



The force for tearing off cover tape is 15 to 60 grams in the arrow direction under the following conditions.

Room Temp. (℃)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

Application Notice

- Storage Conditions(component level)
  To maintain the solder ability of terminal electrodes:
  1. TAI-TECH products meet IPC/JEDEC J-STD-020F standard-MSL, level 1.
  2. Temperature and humidity conditions: Less than 40℃ and 60% RH.
  3. Recommended products should be used within 12 months from the time of delivery.
  4. The packaging material should be kept where no chlorine or sulfur exists in the air.

- Transportation
  1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
  2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
  3. Bulk handling should ensure that abrasion and mechanical shock are minimized.

簽名合法
For Questions, Please Contact with SGS
www.sgs.com.tw

測試報告
Test Report

號碼(No.): ETR24B04639　　日期(Date): 05-Dec-2024　　

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臺慶精密電子(昆山)有限公司 (TAI-TECH ADVANCED ELECTRONICS (KUN-SHAN) CO., LTD.)
慶邦電子元器件 (泗洪) 有限公司 (TAIPAQ ELECTRONICS (SI-HONG) CO., LTD.)
將大科技股份有限公司 (JDX TECHNOLOGY CO., LTD.)
桃園市楊梅區幼獅工業區幼四路1號 (NO. 1, YOU 4TH ROAD, YOUTH INDUSTRIAL DISTRICT, YANG-MEI, TAO-YUAN CITY, TAIWAN R. O. C.)
江蘇省昆山市篷朗昆嘉高科技工業區郭澤路 (GUO-ZE ROAD, KUNJIA HI-TECH INDUSTRIAL PARK, KUN-SHAN, JIANG-SU, CHINA)
中國，江蘇省，宿遷市，泗洪縣，經濟開發區杭州路南側，建設北路東側 (THE SOUTH HANGZHOU ROAD AND THE EAST JIANSHE ROAD，ECONOMIC DEVELOPMENT ZONE，SIHONG COUNTY，SUQIANCITY，JIANGSU PROVINCE，P,R，CHINA)
臺北市信義區信義路5段5號3樓E06室 (ROOM E06, 3RD FLOOR, NO.5, SECTION 5, XINYI ROAD, XINYI DISTRICT, TAIPEI CITY, 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 the applicant as)：

樣品名稱(Sample Name)	:	FERRITE CHIP BEAD、FERRITE CHIP INDUCTOR 、ARRAY、 MCF、 MCM 、YMV 、 APM、 TFPI SERIES
樣品型號(Style/Item No.)	:	FERRITE CHIP BEAD、FERRITE CHIP INDUCTOR 、ARRAY、 MCF、 MCM 、YMV 、 APM、 TFPI SERIES

==========

收件日(Sample Receiving Date)	:	27-Nov-2024
測試期間(Testing Period)	:	27-Nov-2024 to 05-Dec-2024

測試需求(Test Requested) : 依據客戶要求進行測試，測試項目請參閱測試結果表格。 (Testing item(s) is/are specified by client. Please refer to result table for testing item(s).)

測試結果(Test Results) : 請參閱下一頁 (Please refer to following pages.)

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

PIN CODE: CE4AB98A

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測試部位敘述 (Test Part Description)

No.1 : 整體混測 (MIXED ALL PARTS)

測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)
				No.1
鎘 (Cd) (Cadmium (Cd))	參考IEC 62321-5: 2013，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
鉛 (Pb) (Lead (Pb))	參考IEC 62321-5: 2013，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
汞 (Hg) (Mercury (Hg))	參考IEC 62321-4: 2013+ AMD1: 2017，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
六價鉻 Cr(VI) (Hexavalent Chromium Cr(VI))	參考IEC 62321-7-2: 2017，以紫外光-可見光分光光度計分析。(With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.)	mg/kg	8	n.d.

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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)
				No.1
一溴聯苯 (Monobromobiphenyl)	參考IEC 62321-6: 2015，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.)	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.
多溴聯苯總和 (Sum of PBBs)		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.
多溴聯苯醚總和 (Sum of PBDEs)		mg/kg	-	n.d.

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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)
				No.1
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl benzyl phthalate (BBP))	參考IEC 62321-8: 2017，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.)	mg/kg	50	n.d.
鄰苯二甲酸二丁酯 (DBP) (Dibutyl phthalate (DBP))		mg/kg	50	n.d.
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-(2-ethylhexyl) phthalate (DEHP))		mg/kg	50	n.d.
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP))		mg/kg	50	n.d.
鄰苯二甲酸二異癸酯 (DIDP) (Diisodecyl phthalate (DIDP)) (CAS No.: 26761-40-0, 68515-49-1)		mg/kg	50	n.d.
鄰苯二甲酸二異壬酯 (DINP) (Diisononyl phthalate (DINP)) (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 (DNOP)) (CAS No.: 117-84-0)		mg/kg	50	n.d.
鄰苯二甲酸二正戊酯 (DNPP) (Di-n-pentyl phthalate (DNPP)) (CAS No.: 131-18-0)		mg/kg	50	n.d.
鄰苯二甲酸二正己酯 (DNHP) (Di-n-hexyl phthalate (DNHP)) (CAS No.: 84-75-3)		mg/kg	50	n.d.

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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	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(HBCDD) (α- HBCDD, β- HBCDD, γ- HBCDD) (Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD)) (CAS No.: 25637-99-4, 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))	參考IEC 62321-9: 2021，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-9: 2021, analysis was performed by GC/MS.)	mg/kg	20	n.d.
氟 (F) (Fluorine (F)) (CAS No.: 14762-94-8)	參考BS EN 14582: 2016，以離子層析儀分析。(With reference to BS EN 14582: 2016, analysis was performed by IC.)	mg/kg	50	n.d.
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-15-1)		mg/kg	50	n.d.
溴 (Br) (Bromine (Br)) (CAS No.: 10097-32-2)		mg/kg	50	n.d.
碘 (I) (Iodine (I)) (CAS No.: 14362-44-8)		mg/kg	50	n.d.
全氟辛烷磺酸及其鹽類 (PFOS and its salts) (Perfluorooctane sulfonates and its salts (PFOS and its salts)) (CAS No.: 1763-23-1 and its salts)	參考CEN/TS 15968: 2010，以液相層析串聯質譜儀分析。(With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.)	mg/kg	0.01	n.d.
全氟辛酸及其鹽類 (PFOA and its salts) (Perfluorooctanoic acid and its salts (PFOA and its salts)) (CAS No.: 335-67-1 and its salts)	參考CEN/TS 15968: 2010，以液相層析串聯質譜儀分析。(With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.)	mg/kg	0.01	n.d.

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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)
				No.1
全氟辛烷磺酸及其鹽類 (PFOS and its salts) (Perfluorooctane sulfonates and its salts (PFOS and its salts)) (CAS No.: 1763-23-1 and its salts)	修改EN 17681-1: 2022 & EN 17681-2: 2022，以液相層析串聯質譜儀分析。(Modified EN 17681-1: 2022 & EN 17681-2: 2022, analysis was performed by LC/MS/MS.)	mg/kg	0.01	n.d.
全氟辛酸及其鹽類 (PFOA and its salts) (Perfluorooctanoic acid and its salts (PFOA and its salts)) (CAS No.: 335-67-1 and its salts)	修改EN 17681-1: 2022 & EN 17681-2: 2022，以液相層析串聯質譜儀分析。(Modified EN 17681-1: 2022 & EN 17681-2: 2022, analysis was performed by LC/MS/MS.)	mg/kg	0.01	n.d.
聚氯乙烯 (Polyvinyl chloride) (PVC)	參考ASTM E1252: 2021，以傅立葉轉換紅外線光譜儀及焰色法分析。(With reference to ASTM E1252: 2021, analysis was performed by FT-IR and Flame Test.)	**	-	Negative
銻 (Sb) (Antimony (Sb)) (CAS No.: 7440-36-0)	參考US EPA 3052: 1996，以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)		mg/kg	2	n.d.
砷 (As) (Arsenic (As)) (CAS No.: 7440-38-2)		mg/kg	2	n.d.

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備註(Note)：

1. mg/kg = ppm；0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit (方法偵測極限值)
3. n.d. = Not Detected (未檢出)；小於MDL / Less than MDL
4. "-" = Not Regulated (無規格值)
5. **= Qualitative analysis (No Unit) 定性分析(無單位)
6. Negative = Undetectable 陰性(未偵測到/未檢出); Positive = Detectable 陽性(已偵測到/檢出)
7. 樣品的測試是基於申請人要求混合測試，報告中的混合測試結果不代表其中個別單一材質的含量。
   The sample(s) was/were analyzed on behalf of the applicant as mixing sample in one testing. The above result(s) was/were only given as the informality value.

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測試報告
Test Report

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PFAS Remark：

現有PFAS定量技術是分析PFAS物質的特定結構，但同碳數族群之PFAS酸及鹽類物質，其可被辨識的特定結構相同，因此無法區別所分析的特定結構是來自酸或者鹽類，故測試結果為同碳數族群之PFAS之酸及鹽類物質的濃度總合。下表PFAS物質濃度皆已包含在測試結果中，相關資訊請參見下表：(下表列舉PFAS物質僅為範例，並不包含所有同碳數族群之PFAS鹽類。)
(The quantitative technology of PFAS is to analyze the specific structure of PFAS substances. However, PFAS acid and its salts with the same carbon number group have the same specific structure that can be identified. The tested results of the analyzed specific structure cannot be distinguished to identify the contribution from PFAS acid or its salts. Therefore, the tested results display the sum of concentrations of PFAS acids and its salts with the same carbon number group. The concentration of PFAS substances in the below table have been included in the tested results, please refer to the table for relevant information: (The listed PFAS substances are examples only, it do not include all PFAS salts with the same carbon number group.))

群組名稱 (Group Name)	物質名稱 (Substance Name)	CAS No.
PFOS, 及其鹽&衍生物 (PFOS, its salts & derivatives)	全氟辛烷磺酸 (Perfluorooctane sulfonates) (PFOS)	1763-23-1
	全氟辛基磺酸鉀 (PFOS-K) Potassium perfluorooctanesulfonate (PFOS-K)	2795-39-3
	全氟辛基磺酸鋰 (PFOS-Li) Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)	29457-72-5
	全氟辛基磺酸銨 (PFOS-NH_4) Perfluorooctanesulfonic acid, ammonium salt (PFOS-NH_4)	29081-56-9
	全氟辛基磺酸二乙醇銨 (PFOS-$NH(OH)_2$) Perfluorooctane sulfonate diethanolamine salt (PFOS-$NH(OH)_2$)	70225-14-8
	全氟辛基磺酸四乙基銨 (PFOS-$N(C_2H_5)_4$) Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-$N(C_2H_5)_4$)	56773-42-3
	全氟辛基磺酸二癸二甲基銨 (PFOS-DDA) N-decyl-N,N-dimethyldecan-1-aminium 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctane-1-sulfonate (PFOS-DDA)	251099-16-8

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群組名稱 (Group Name)	物質名稱 (Substance Name)	CAS No.
PFOS, 及其鹽&衍生物 (PFOS, its salts & derivatives)	全氟辛基磺酸四丁基銨 (PFOS-N(C_4H_9)$_4$) TetrabutylAmmonium perfluorooctanesulfonate (PFOS-N(C_4H_9)$_4$)	111873-33-7
	全氟辛基磺醯氟 (POSF) Perfluorooctane sulfonyl fluoride (POSF)	307-35-7
	全氟辛基磺酸鎂 (PFOS-Mg) Perfluorooctanesulfonic acid, magnesium salt (PFOS-Mg)	91036-71-4
	全氟辛基磺酸鈉 (PFOS-Na) Perfluorooctanesulfonic acid, sodium salt (PFOS-Na)	4021-47-0
	全氟辛烷磺酸哌啶 Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate	71463-74-6
	全氟辛烷磺酸鹽 Perfluorooctanesulfonate (anion)	45298-90-6
	全氟辛烷磺酸與 N,N-二乙基乙胺 (1:1) (PFOS-N(C_2H_5)$_3$) 1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, compd. with N,N-diethylethanamine (1:1) (PFOS-N(C_2H_5)$_3$)	54439-46-2
	N,N,N-三甲基-1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十七氟-1-辛烷磺酸甲銨 (1:1) (PFOS-N(CH_3)$_4$) Methanaminium, N,N,N-trimethyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) (PFOS-N(CH_3)$_4$)	56773-44-5
	1-五胺，N,N,N-三丙基-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十七氟-1 -辛烷磺酸鹽(1:1) (PFOS-N(C_3H_7)$_3$(C_5H_{11})) 1-Pentanaminium, N,N,N-tripropyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) (PFOS-N(C_3H_7)$_3$(C_5H_{11}))	56773-56-9
	1-丁銨，N,N-二丁基-N-甲基-，1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8 ,8-十七氟-1-辛烷磺酸鹽 (1:1) (PFOS-N(C_4H_9)$_3$(CH_3)) 1-Butanaminium, N,N-dibutyl-N-methyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) (PFOS-N(C_4H_9)$_3$(CH_3))	124472-68-0

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群組名稱 (Group Name)	物質名稱 (Substance Name)	CAS No.
PFOS, 及其鹽&衍生物 (PFOS, its salts & derivatives)	碘鎓，雙[4-(1,1-二甲基乙基)苯基]-，1,1,2,2,3,3,4,4,5,5,6,6,7,7 ,8,8,8 -十七氟-1-辛烷磺酸鹽 (1:1) Iodonium, bis[4-(1,1-dimethylethyl)phenyl]-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1)	213740-80-8
	二苯基鋶(2,4,6-三甲基苯基)-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8 ,8-十七氟- 1-辛烷磺酸鹽 (1:1) Sulfonium, diphenyl(2,4,6-trimethylphenyl)-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1)	258341-99-0
	吡啶鎓，1-十六烷基-，1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十七氟-1 -辛烷磺酸鹽 (1:1) Pyridinium, 1-hexadecyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1)	334529-63-4
	1-癸胺，N,N,N-三乙基-，1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十七氟-1 -辛烷磺酸鹽(1:1) 1-Decanaminium, N,N,N-triethyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1)	773895-92-4
	全氟辛烷磺酸四丁基鏻 (PFOS-P(C_4H_9)$_4$)) Tetrabutylphosphonium perfluorooctane sulfonate (PFOS-P(C_4H_9)$_4$))	2185049-59-4
	全氟辛烷磺酸二乙胺鹽 (PFOS-$C_4H_{11}N$) Perfluorooctanesulfonic acid diethylamine salt (PFOS-$C_4H_{11}N$)	2205029-08-7
	庚基二甲基{2-[(2-甲基丙-2-烯酰基)氧基]乙基}全氟辛烷磺酸氮紮鹽 (PFOS-$C_{15}H_{30}NO_2$) Heptyldimethyl{2-[(2-methylprop-2-enoyl)oxy]ethyl}azanium perfluorooctanesulfonate (PFOS-$C_{15}H_{30}NO_2$)	1203998-97-3
	1-辛烷磺酸，1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十七氟-,1,1' -酸酐 (PFOSAN) 1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, 1,1'-anhydride (PFOSAN)	423-92-7

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群組名稱 (Group Name)	物質名稱 (Substance Name)	CAS No.
PFOA, 及其鹽&衍生物 (PFOA, its salts & derivatives)	全氟辛酸 (Perfluorooctanoic acid) (PFOA)	335-67-1
	全氟辛酸鈉 (PFOA-Na) Sodium perfluorooctanoate (PFOA-Na)	335-95-5
	全氟辛酸鉀 (PFOA-K) Potassium perfluorooctanoate (PFOA-K)	2395-00-8
	全氟辛酸銀 (PFOA-Ag) Silver perfluorooctanote (PFOA-Ag)	335-93-3
	全氟辛氟 (PFOA-F) Perfluorooctanoyl fluoride (PFOA-F)	335-66-0
	全氟辛酸銨 (APFO) Ammonium pentadecafluorooctanoate (APFO)	3825-26-1
	全氟辛酸鋰 (PFOA-Li) Lithium perfluorooctanoate (PFOA-Li)	17125-58-5
	全氟辛酸鈷 (PFOA-Co) Cobalt perfluorooctanoate (PFOA-Co)	35965-01-6
	全氟辛酸銫 (PFOA-Cs) Cesium perfluorooctanoate (PFOA-Cs)	17125-60-9
	全氟辛酸鉻 (PFOA-Cr(3^+)) Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, chromium(3+) (PFOA-Cr(3^+))	68141-02-6
	全氟辛酸-哌嗪(2:1) PFOA-NH($C_4H_{10}N$) Pentadecafluorooctanoic acid--piperazine (2/1)PFOA-NH($C_4H_{10}N$)	423-52-9
	全氟辛酸鹽 Pentadecafluorooctanoate (anion)	45285-51-6
	全氟辛酸酐 Perfluorooctanoic Anhydride	33496-48-9

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	全氟辛酸四甲銨鹽 Tetramethylammoniumperfluoroctanoat	32609-65-7
	1-丙銨，N,N,N-三丙基-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十五氟辛酸(1:1) 1-Propanaminium, N,N,N-tripropyl-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctanoate (1:1)	277749-00-5
	辛酸，2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十五氟-鉀鹽，水合物 (1:1:2) (PFOA-K$(H_2O)_2$) Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, potassium salt, hydrate (1:1:2) (PFOA-K$(H_2O)_2$)	98065-31-7
	辛酸，2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十五氟-，化合物。與乙胺 (1:1) (PFOA-C_2H_7N) Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, compd. with ethanamine (1:1) (PFOA-C_2H_7N)	1376936-03-6
	十五氟辛酸化合物與吡啶 (1:1) (9CI) (PFOA-C_5H_5N) Octanoic acid, pentadecafluoro-, compd. with pyridine (1:1) (9CI) (PFOA-C_5H_5N)	95658-47-2
	十五氟辛酸-1-苯基哌嗪(1:1) (PFOA-$C_{10}H_{14}N_2$) Pentadecafluorooctanoic acid- 1-phenylpiperazine(1:1) (PFOA-$C_{10}H_{14}N_2$)	1514-68-7
	1-辛胺，N,N,N-三甲基-，2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-十五氟辛酸(1:1) (PFOA- $C_{11}H_{26}N$) 1-Octanaminium, N,N,N-trimethyl-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctanoate (1:1) (PFOA- $C_{11}H_{26}N$)	927835-01-6

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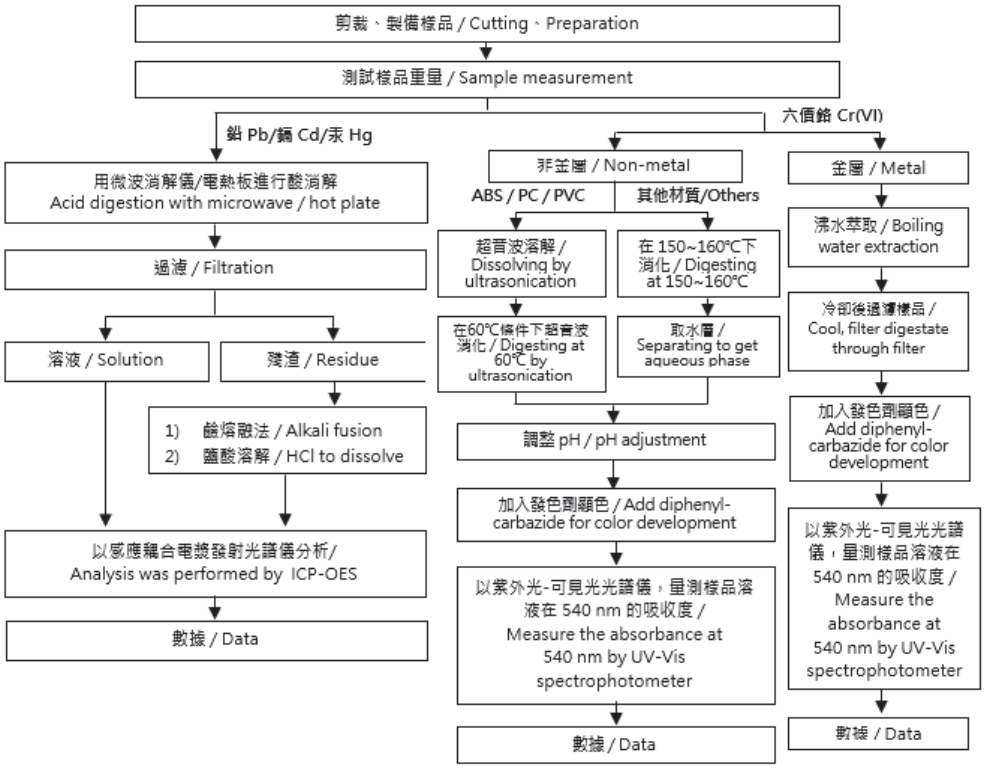
重金屬流程圖 / Analytical flow chart of heavy metal

根據以下的流程圖之條件，樣品已完全溶解。（六價鉻測試方法除外）
These samples were dissolved totally by pre-conditioning method according to below flow chart.
（Cr^{6+} test method excluded）



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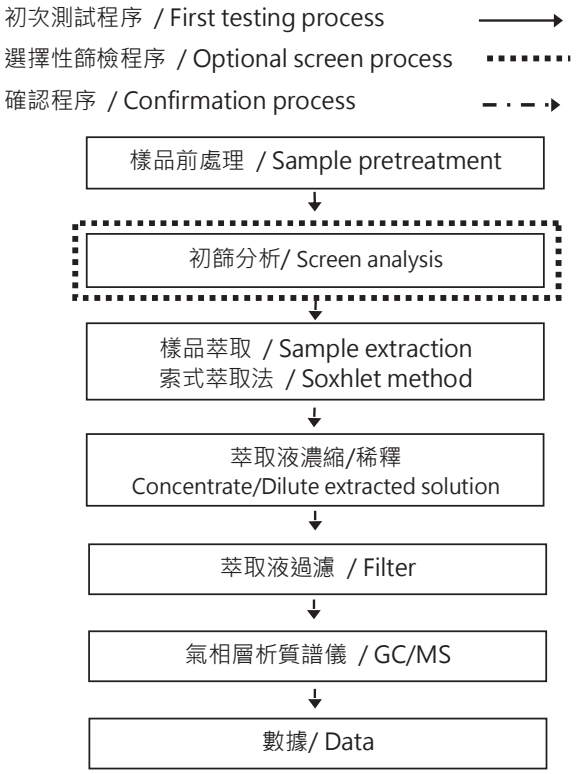
多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBBs/PBDEs



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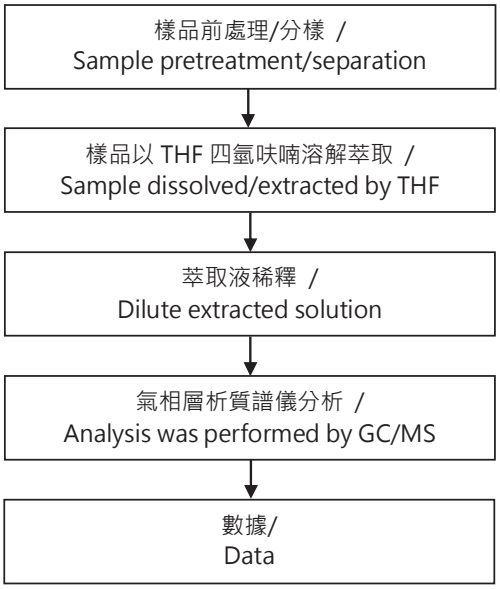
可塑劑分析流程圖 / Analytical flow chart - Phthalate

【測試方法/Test method: IEC 62321-8】



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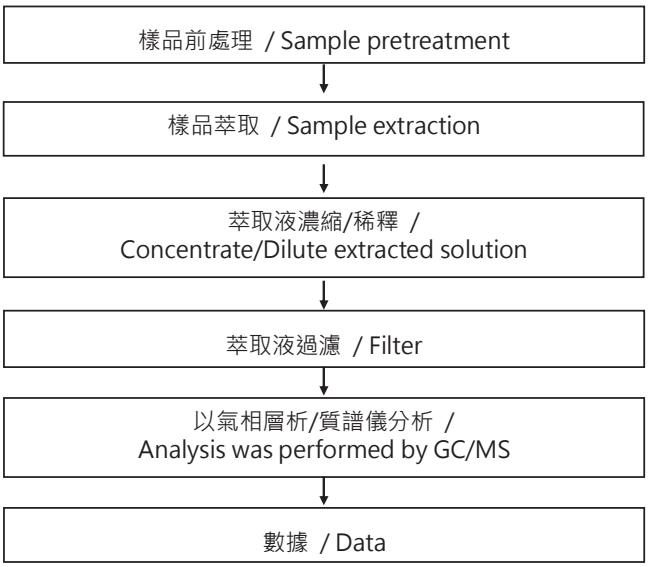
六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD



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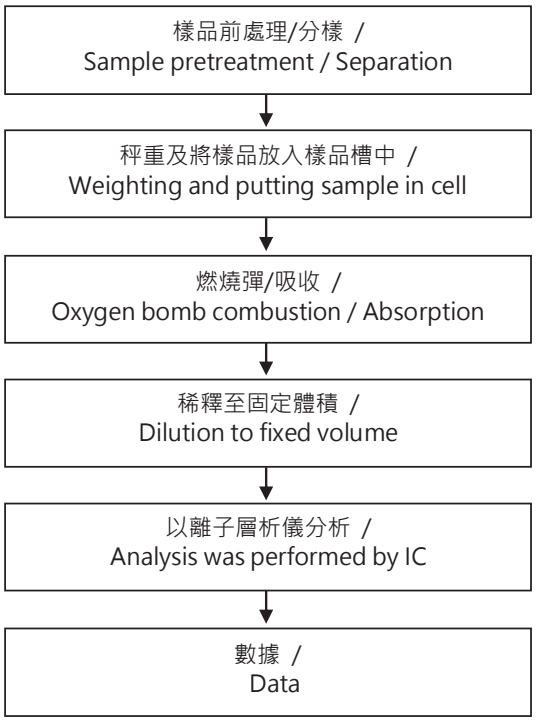
鹵素分析流程圖 / Analytical flow chart - Halogen



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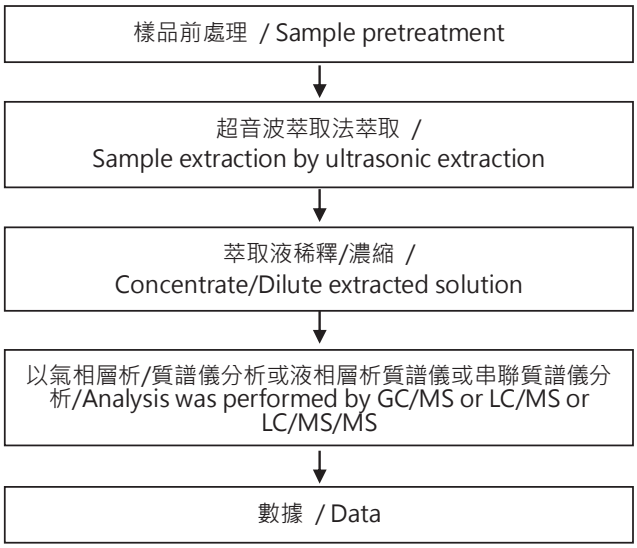
全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)



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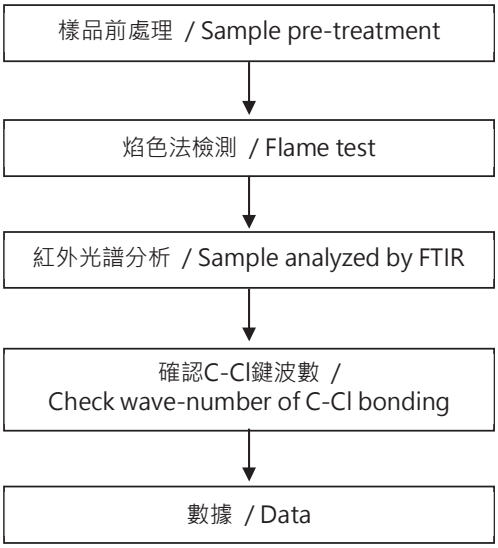
聚氯乙烯物質判定分析流程圖 / Analysis flow chart - PVC



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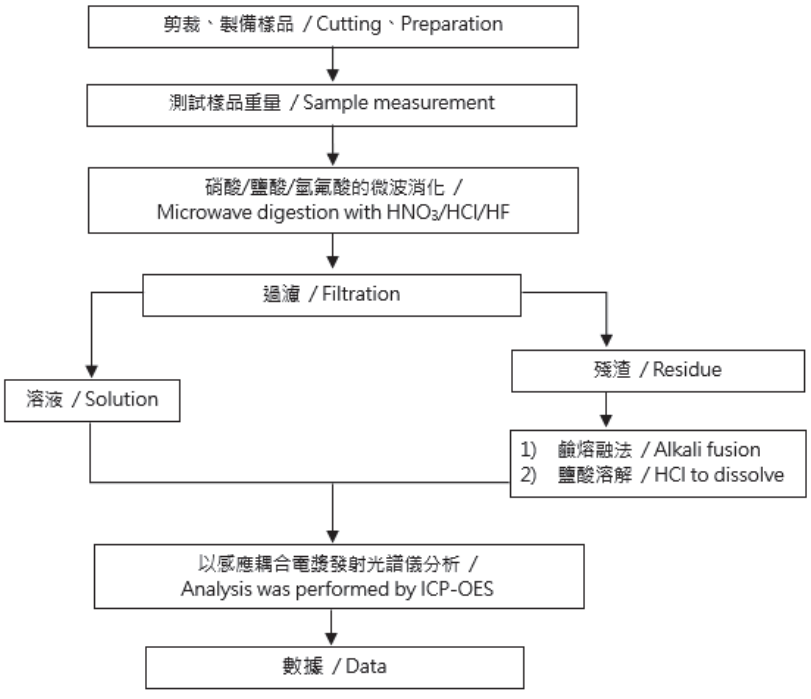
元素(含重金屬)分析流程圖 / Analytical flow chart of elements (Heavy metal included)

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.

【參考方法/Reference method：US EPA 3051A、US EPA 3052】



* US EPA 3051A 方法未添加氫氟酸 / US EPA 3051A method does not add HF.

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測試報告
Test Report

西北臺慶科技股份有限公司 (TAI-TECH ADVANCED ELECTRONICS CO., LTD.)
臺慶精密電子(昆山)有限公司 (TAI-TECH ADVANCED ELECTRONICS (KUN-SHAN) CO., LTD.)
慶邦電子元器件 (泗洪) 有限公司 (TAIPAQ ELECTRONICS (SI-HONG) CO., LTD.)
將大科技股份有限公司 (JDX TECHNOLOGY CO., LTD.)
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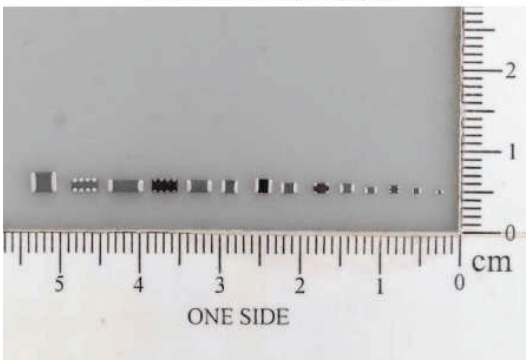
江蘇省昆山市篷朗昆嘉高科技工業區郭澤路 (GUO-ZE ROAD, KUNJIA HI-TECH INDUSTRIAL PARK, KUN-SHAN, JIANG-SU, CHINA)
中國，江蘇省，宿遷市，泗洪縣，經濟開發區杭州路南側，建設北路東側 (THE SOUTH HANGZHOU ROAD AND THE EAST JIANSHE ROAD，ECONOMIC DEVELOPMENT ZONE，SIHONG COUNTY，SUQIANCITY，JIANGSU PROVINCE，P,R，CHINA)
臺北市信義區信義路5段5號3樓E06室 (ROOM E06, 3RD FLOOR, NO.5, SECTION 5, XINYI ROAD, XINYI DISTRICT, TAIPEI CITY, TAIWAN, R.O.C.)

*** 照片中如有箭頭標示，則表示為實際檢測之樣品/部位. ***
(The tested sample / part is marked by an arrow if it's shown on the photo.)

ETR24B04639



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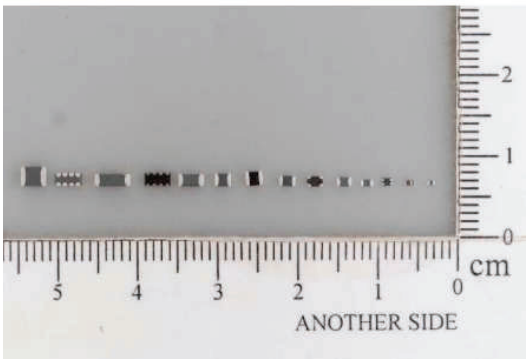

** 報告結尾 (End of Report) **

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