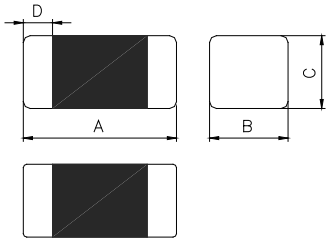
High Current Ferrite Chip Bead(Lead Free) HFZ-SERIES

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. High Current Bead Low RDC
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

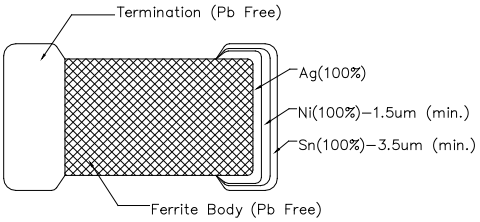


Chip size				
Size	A(mm)	B(mm)	C(mm)	D(mm)
1005	1.00±0.10	0.50±0.10	0.50±0.10	0.25±0.10
1608	1.60±0.15	0.80±0.15	0.80±0.15	0.30±0.20
2012	2.00±0.20	1.25±0.20	0.85±0.20	0.50±0.30
3216	3.20±0.20	1.60±0.20	1.10±0.20	0.50±0.30

3. Part Numbering

HFZ	1005	PF	-	300	T	30
A	B	C		D	E	F

A: Series
B: Dimension L x W
C: Material Lead Free Material
D: Impedance 300=30Ω
E: Packaging T=Taping and Reel, B=Bulk(Bags)
F: Rated Current 30=3000mA



4. Specification

Tai-Tech Part Number	Impedance (Ω)	Test Frequency (MHz)	DC Resistance (Ω) max.	Rated Current (mA) max.
HFZ1005PF-100T40	10±25%	100	0.018	4000
HFZ1005PF-300T30	30±25%	100	0.022	3000
HFZ1005PF-600T25	60±25%	100	0.032	2500
HFZ1005PF-800T23	80±25%	100	0.038	2300
HFZ1005PF-121T20	120±25%	100	0.050	2000
HFZ1005PF-221T15	220±25%	100	0.095	1500
HFZ1005PF-301T12	300±25%	100	0.150	1200
HFZ1005PF-471T11	470±25%	100	0.180	1100
HFZ1005PF-601T10	600±25%	100	0.200	1000

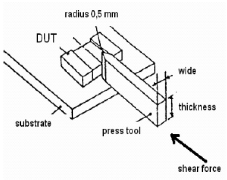
- Rated current: based on temperature rise test
- In compliance with EIA 595

Tai-Tech Part Number	Impedance (Ω)	Test Frequency (MHz)	DC Resistance (Ω) max.	Rated Current (mA) max.
HFZ1608PF-300T50	30±25%	100	0.010	5000
HFZ1608PF-600T40	60±25%	100	0.020	4000
HFZ1608PF-800T30	80±25%	100	0.030	3000
HFZ1608PF-101T30	100±25%	100	0.030	3000
HFZ1608PF-121T30	120±25%	100	0.035	3000
HFZ1608PF-151T25	150±25%	100	0.040	2500
HFZ1608PF-221T23	220±25%	100	0.050	2300
HFZ1608PF-301T22	300±25%	100	0.070	2200
HFZ1608PF-471T20	470±25%	100	0.090	2000
HFZ1608PF-601T20	600±25%	100	0.095	2000
HFZ1608PF-102T15	1000±25%	100	0.150	1500
HFZ2012PF-300T85	30±25%	100	0.004	8500
HFZ2012PF-700T60	70±25%	100	0.009	6000
HFZ2012PF-111T50	110±25%	100	0.013	5000
HFZ2012PF-181T40	180±25%	100	0.020	4000
HFZ2012PF-331T28	330±25%	100	0.040	2800
HFZ2012PF-471T25	470±25%	100	0.050	2500
HFZ2012PF-601T23	600±25%	100	0.060	2300
HFZ2012PF-102T16	1000±25%	100	0.120	1600
HFZ3216PF-300T110	30±25%	100	0.0025	11000
HFZ3216PF-500T120	50±25%	100	0.0025	12000
HFZ3216PF-121T60	120±25%	100	0.0090	6000
HFZ3216PF-271T45	270±25%	100	0.0160	4500
HFZ3216PF-471T40	470±25%	100	0.0200	4000
HFZ3216PF-601T29	600±25%	100	0.0380	2900
HFZ3216PF-801T25	800±25%	100	0.0500	2500
HFZ3216PF-102T20	1000±25%	100	0.0750	2000

- Rated current: based on temperature rise test
- In compliance with EIA 595

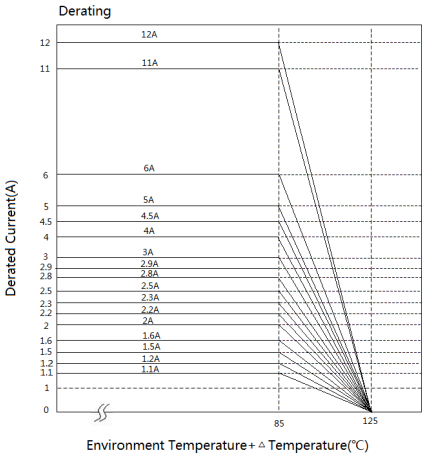
5. Reliability and Test Condition

<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td>Series No.</td><td>HFZ</td><td>--</td></tr>
<tr><td>Operating Temperature</td><td>-55~+125℃
(Including self-temperature rise)</td><td>--</td></tr>
<tr><td>Transportation
Storage Temperature</td><td>-55~+125℃
(on board)</td><td>For long storage conditions, please see the Application Notice</td></tr>
<tr><td>Impedance (Z)</td><td rowspan="3">Refer to standard electrical characteristics list</td><td>Agilent4291
Agilent E4991
Agilent4287
Agilent16192</td></tr>
<tr><td>DC Resistance</td><td>Agilent 4338</td></tr>
<tr><td>Rated Current</td><td>DC Power Supply
Over Rated Current requirements, there will be some risk</td></tr>
<tr><td>Temperature Rise Test</td><td>Rated Current < 1A ΔT 20℃Max
Rated Current ≧ 1A ΔT 40℃Max</td><td>1. Applied the allowed DC current.
2. Temperature measured by digital surface thermometer.</td></tr>
<tr><td>Life test</td><td rowspan="2">Appearance: no damage.
Impedance: within±15%of initial value.
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles)
Temperature: 125±2℃
Applied current: rated current.
Duration: 1000±12hrs.
Measured at room temperature after placing for 24±2 hrs.</td></tr>
<tr><td>Load Humidity</td><td>Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles)
Humidity: 85±2%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.</td></tr>
<tr><td>Thermal shock</td><td>Appearance: no damage.
Impedance: within±15%of initial value.
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E 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.</td></tr>
<tr><td>Vibration</td><td>Appearance：No damage.
Impedance：within±15% of initial value
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E 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)。</td></tr>
<tr><td>Bending</td><td>Appearance：No damage.
Impedance：within±10% of initial value
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>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.</td></tr>
<tr><td>Shock</td><td>Appearance：No damage.
Impedance：within±10% of initial value
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Test condition:
<table><tr><th>Type</th><th>Peak Value (g's)</th><th>Normal duration (D) (ms)</th><th>Wave form</th><th>Velocity change (Vi)ft/sec</th></tr><tr><td>SMD</td><td>50</td><td>11</td><td>Half-sine</td><td>11.3</td></tr><tr><td>Lead</td><td>50</td><td>11</td><td>Half-sine</td><td>11.3</td></tr></table></td></tr>
</table>

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 RDC：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 RDC：within ±15% of initial value and shall not exceed the specification value 	Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E 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

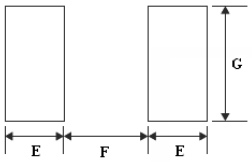
For the ferrite chip bead which withstanding current over 1.5A, as the operating temperature over 85℃, the derating current information is necessary to consider with. For the detail derating of current, please refer to the Derated Current vs. Operating Temperature curve.



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)
HFZ	1005	1.0±0.10	0.50±0.10	0.50±0.10	0.25±0.10	0.50	0.40	0.60
	1608	1.6±0.15	0.80±0.15	0.80±0.15	0.30±0.20	0.80	0.85	0.95
	2012	2.0±0.20	1.25±0.20	0.85±0.20	0.50±0.30	1.05	1.00	1.45
	3216	3.2±0.20	1.60±0.20	1.10±0.20	0.50±0.30	1.05	2.20	1.80



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:

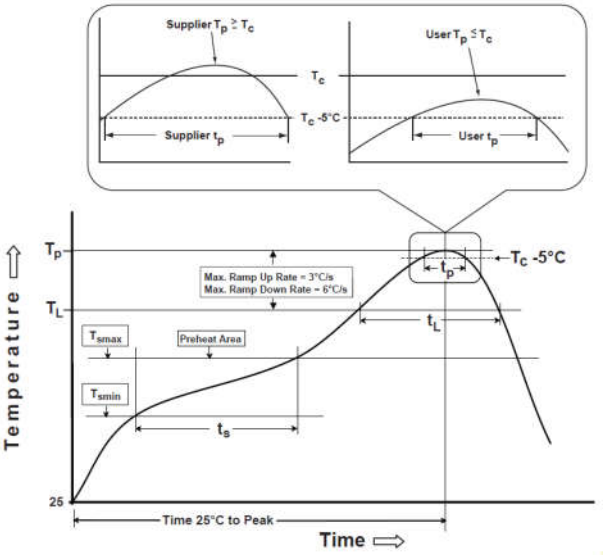
Recommended temperature profiles for lead free re-flow soldering in Figure 1. Table 1.1&1.2 (J-STD-020E)

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.)

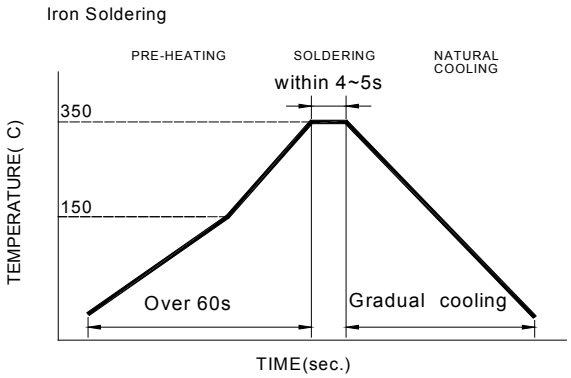
- Preheat circuit and products to 150℃
- 350℃ tip temperature (max)
- Never contact the ceramic with the iron tip
- 1.0mm tip diameter (max)
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- Limit soldering time to 4~5sec.

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)

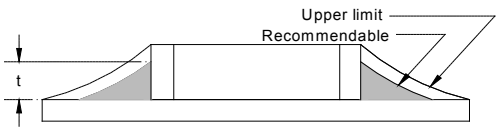
	Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
PB-Free Assembly	<1.6mm	260℃	260℃	260℃
	1.6-2.5mm	260℃	250℃	245℃
	≥2.5mm	250℃	245℃	245℃

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

6-2.3 Solder Volume:

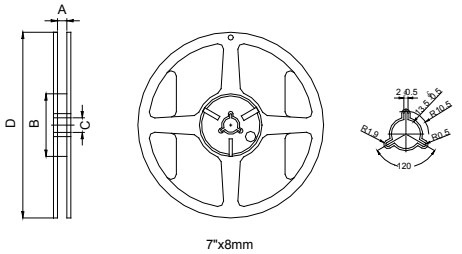
Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance. Solder shall be used not to be exceed as shown in right side:

Minimum fillet height = soldering thickness + 25% product height



7. Packaging Information

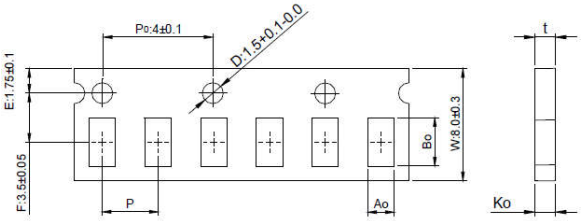
7-1. Reel Dimension



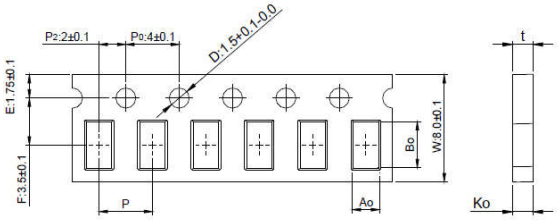
Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x8mm	9.0±0.5	60±2	13.5±0.5	178±2

7-2.1 Tape Dimension / 8mm

■Material of taping is paper

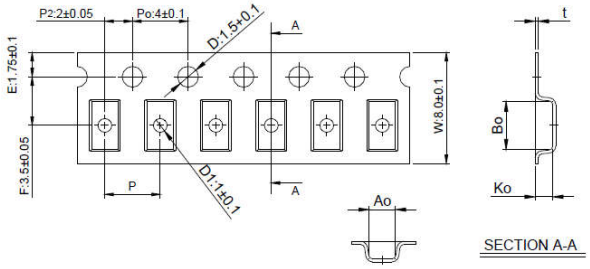


Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)
100505	1.12±0.03	0.62±0.03	0.60±0.03	2.0±0.05	0.60±0.03



Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)
160808	1.90±0.05	1.10+0.05	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

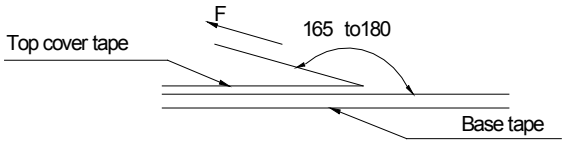


Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)	D1(mm)
321611	3.35±0.10	1.75±0.10	1.25±0.10	4.0±0.10	0.23±0.05	1.0±0.10

7-3. Packaging Quantity

Chip Size	321611	201209	160808	100505
Chip / Reel	3000	4000	4000	10000
Inner box	15000	20000	20000	50000
Middle box	75000	100000	100000	250000
Carton	150000	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

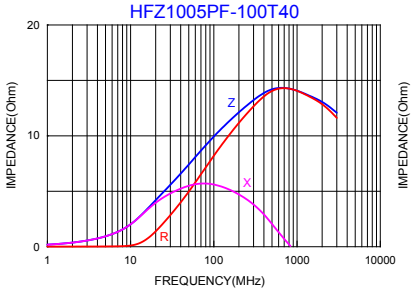
Application Notice

・Storage Conditions(component level)
To maintain the solder ability of terminal electrodes:
1. TAI-TECH products meet IPC/JEDEC J-STD-020E 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.

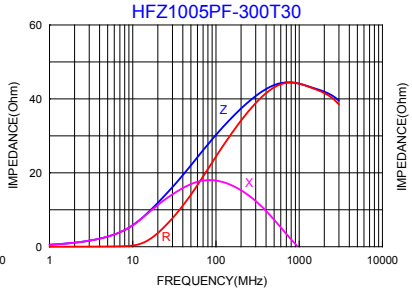
・Transportation
1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
3. Bulk handling should ensure that abrasion and mechanical shock are minimized.

Impedance Frequency Characteristics(Typical)

HFZ1005PF-100T40



HFZ1005PF-300T30



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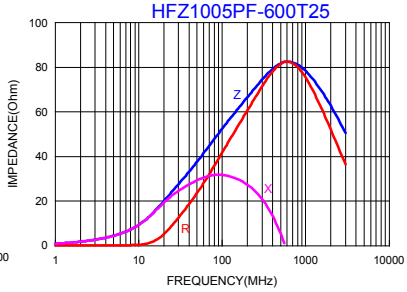

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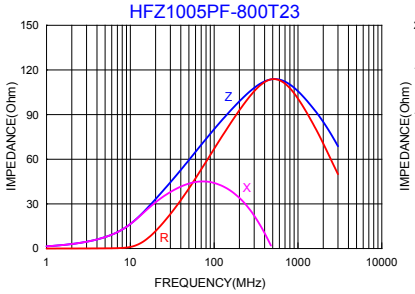

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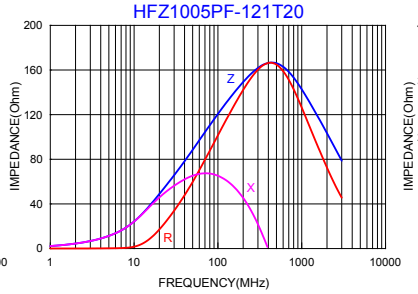

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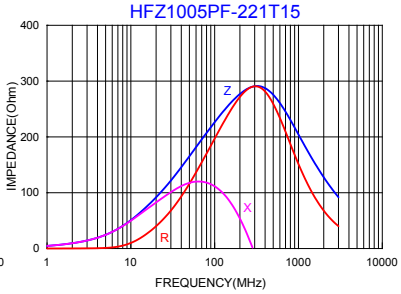

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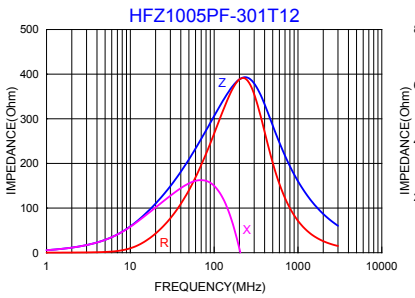

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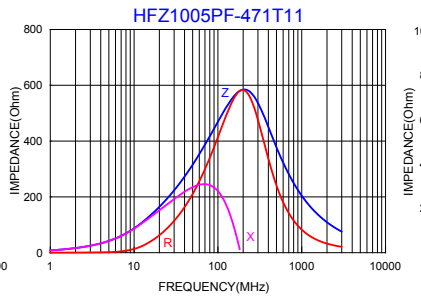
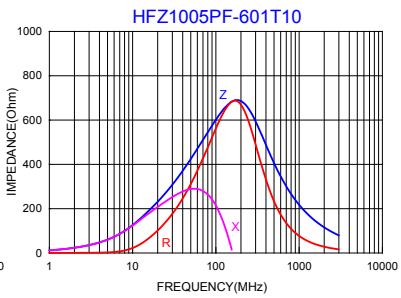
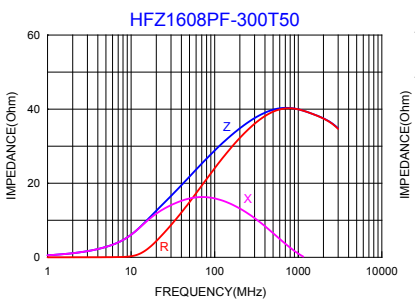


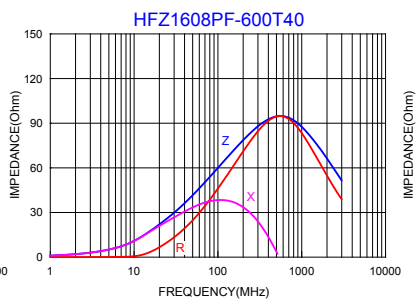
HFZ1005PF-601T10



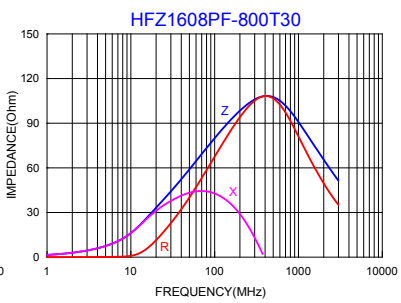
HFZ1608PF-300T50



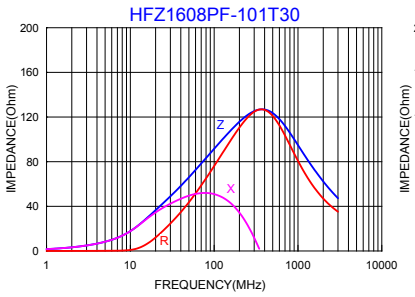
HFZ1608PF-600T40



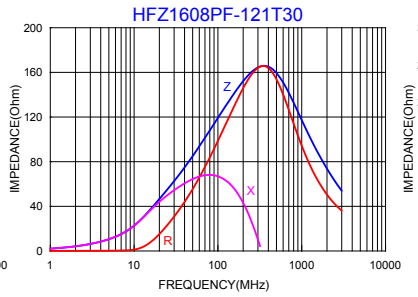
HFZ1608PF-800T30



HFZ1608PF-101T30



HFZ1608PF-121T30



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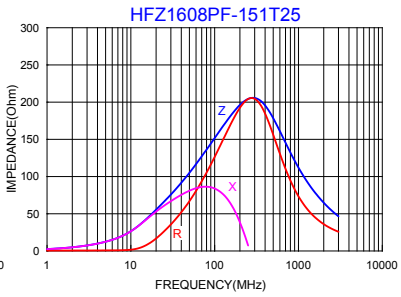
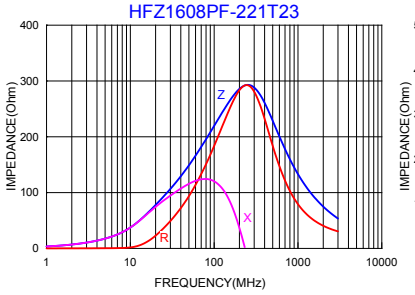
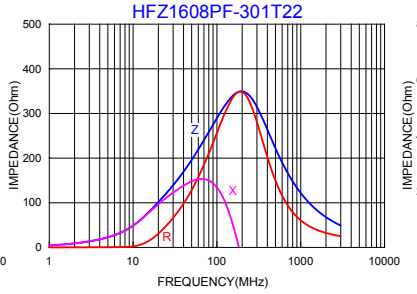


Impedance Frequency Characteristics(Typical)

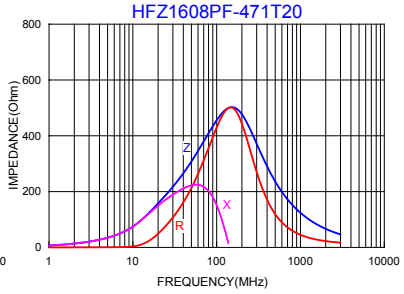
HFZ1608PF-221T23



HFZ1608PF-301T22



HFZ1608PF-471T20



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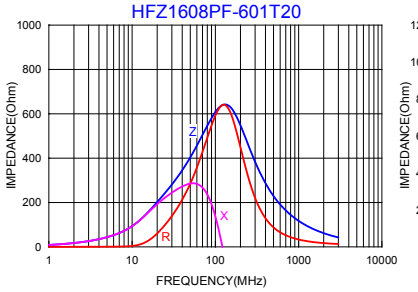
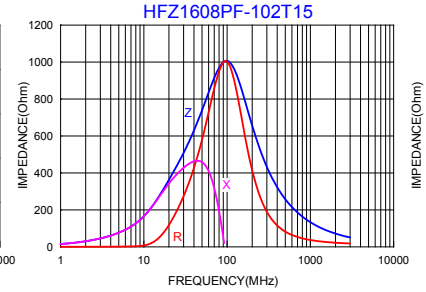


HFZ1608PF-102T15



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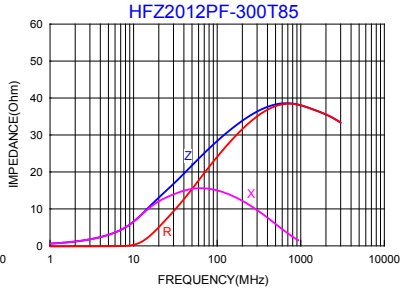

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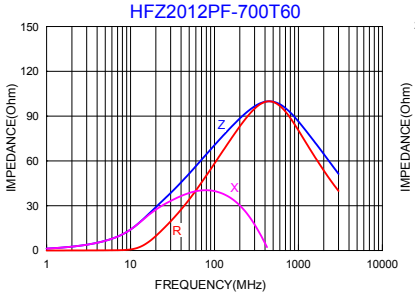
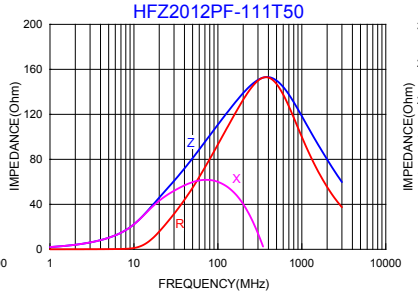
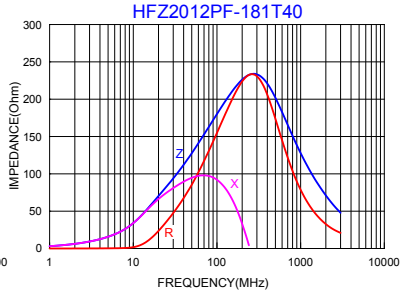


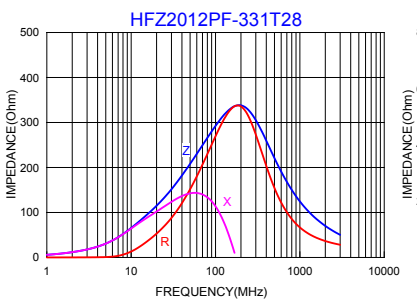
HFZ2012PF-111T50



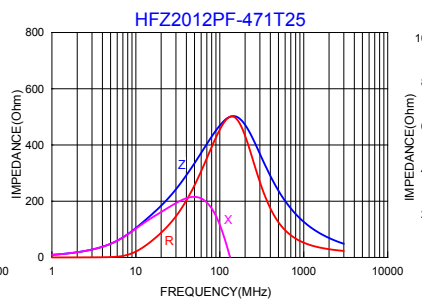
HFZ2012PF-181T40



HFZ2012PF-331T28



HFZ2012PF-471T25



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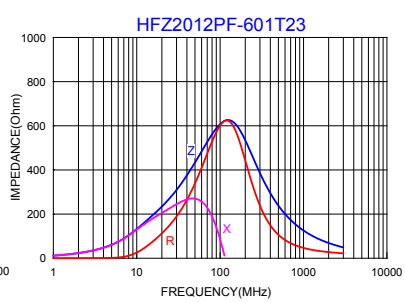

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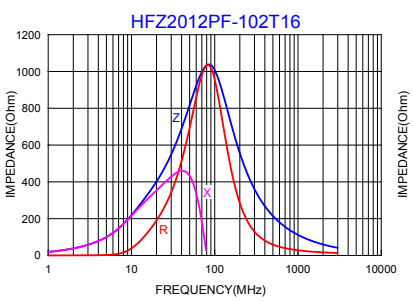
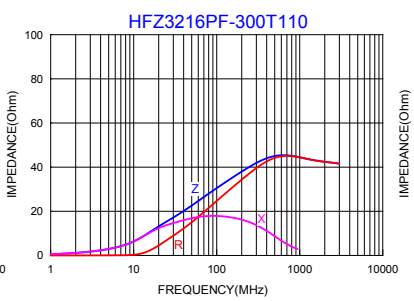


HFZ3216PF-300T110



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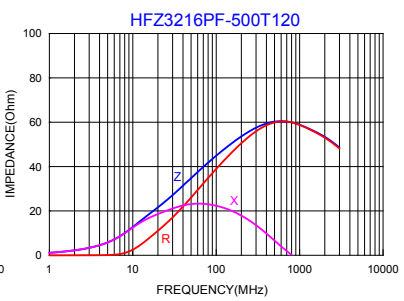
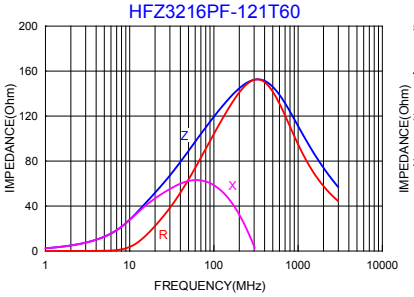


Impedance Frequency Characteristics(Typical)

HFZ3216PF-121T60



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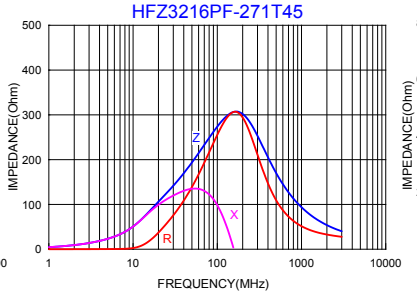

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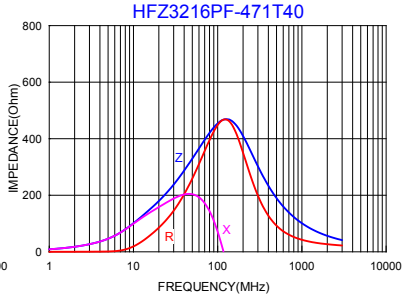

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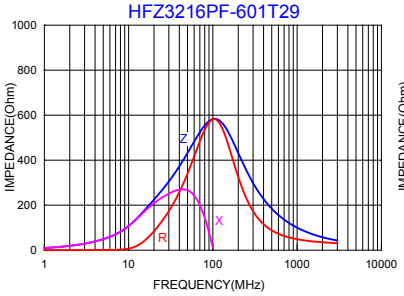

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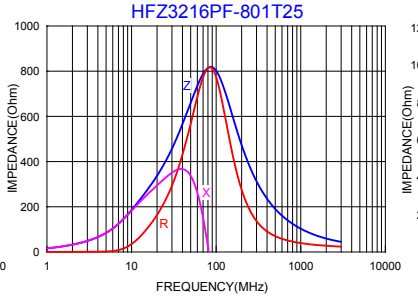

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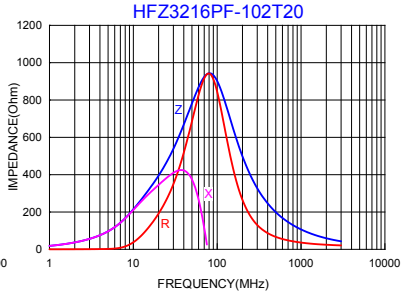

測試報告
Test Report

號碼(No.): ETR22B04558 日期(Date): 06-Dec-2022

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

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

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收件日(Sample Receiving Date)	:	29-Nov-2022
測試期間(Testing Period)	:	29-Nov-2022 to 06-Dec-2022

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

CHECK REPORT
PIN CODE: 4545AB9D

測試報告
Test Report

西北臺慶科技股份有限公司 (TAI-TECH ADVANCED ELECTRONICS CO., LTD.)
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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)) (CAS No.: 7440-43-9)	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)) (CAS No.: 7439-92-1)	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)) (CAS No.: 7439-97-6)	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)) (CAS No.: 18540-29-9)	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.

測試報告
Test Report

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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.

測試報告
Test Report

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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)) (CAS No.: 85-68-7)	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)) (CAS No.: 84-74-2)		mg/kg	50	n.d.
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-(2-ethylhexyl) phthalate (DEHP)) (CAS No.: 117-81-7)		mg/kg	50	n.d.
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP)) (CAS No.: 84-69-5)		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) (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) (CAS No.: 335-67-1 and its salts)		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

測試報告
Test Report

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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)
				No.1
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.
砷 (As) (Arsenic (As)) (CAS No.: 7440-38-2)		mg/kg	2	n.d.
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)		mg/kg	2	n.d.

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); Positive = Detectable 陽性(已偵測到)
7. 全氟辛烷磺酸及其鹽類包含等物質 (PFOS and its salts including) :
   CAS No.: 1763-23-1, 2795-39-3, 29457-72-5, 29081-56-9, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7, 91036-71-4, 4021-47-0 and others.
8. 全氟辛酸及其鹽類包含等物質 (PFOA and its salts including) :
   CAS No.: 335-67-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0, 3825-26-1 and others.
9. 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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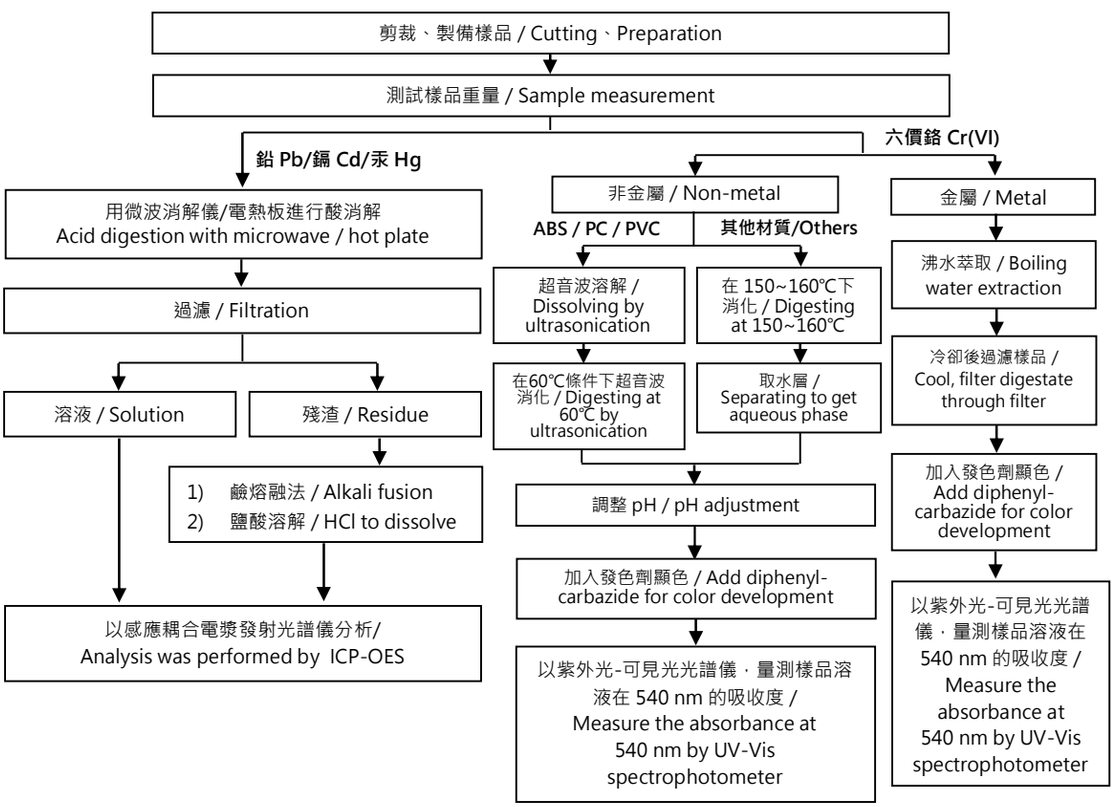
重金屬流程圖 / Analytical flow chart of heavy metal

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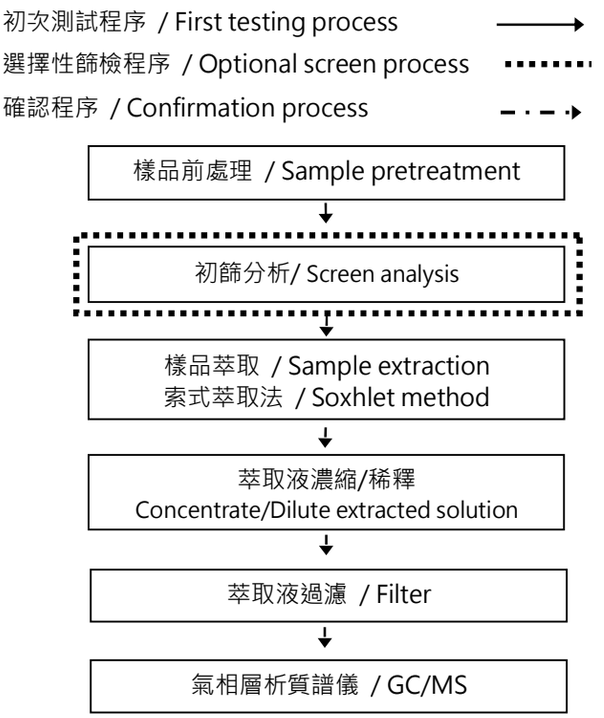
多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBBs/PBDEs



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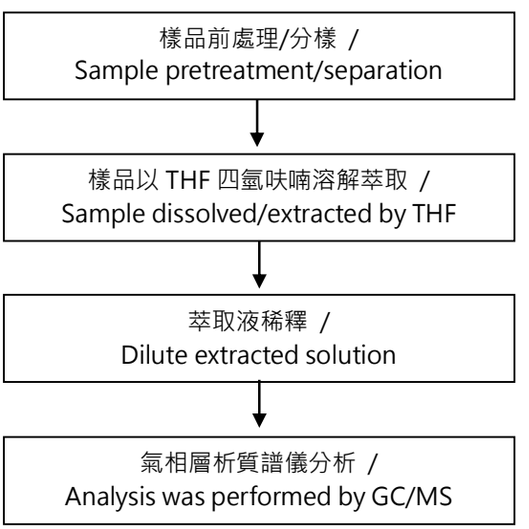
可塑劑分析流程圖 / Analytical flow chart - Phthalate

【測試方法/Test method: IEC 62321-8】



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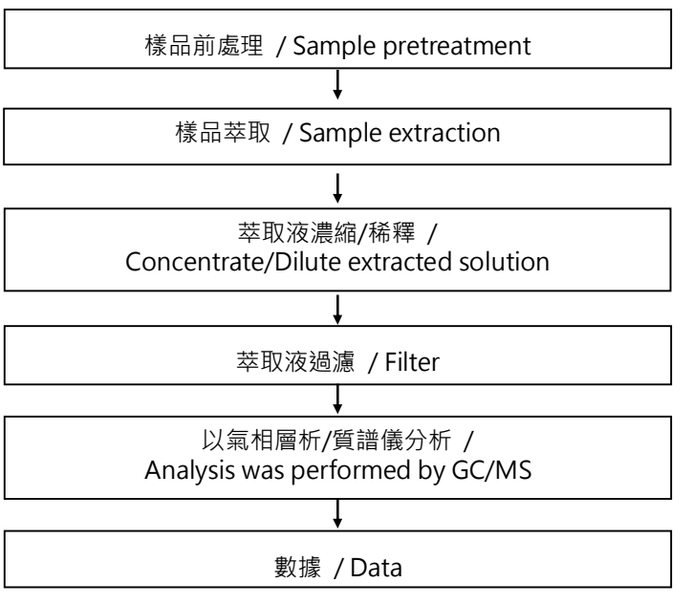
六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD



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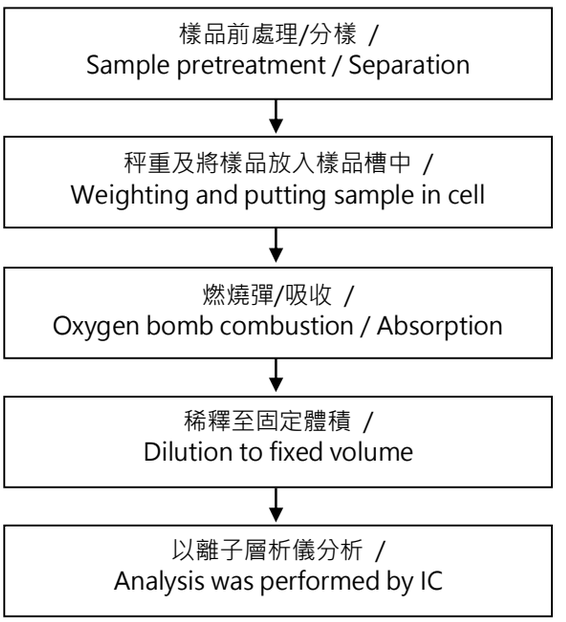
鹵素分析流程圖 / Analytical flow chart - Halogen



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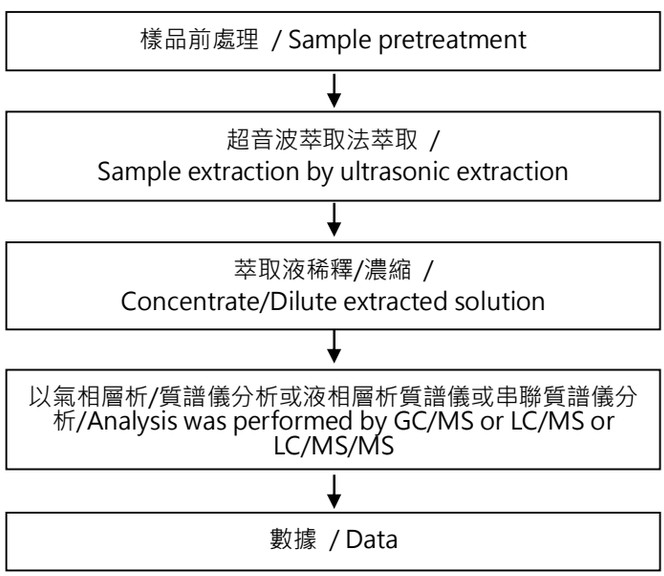
全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)



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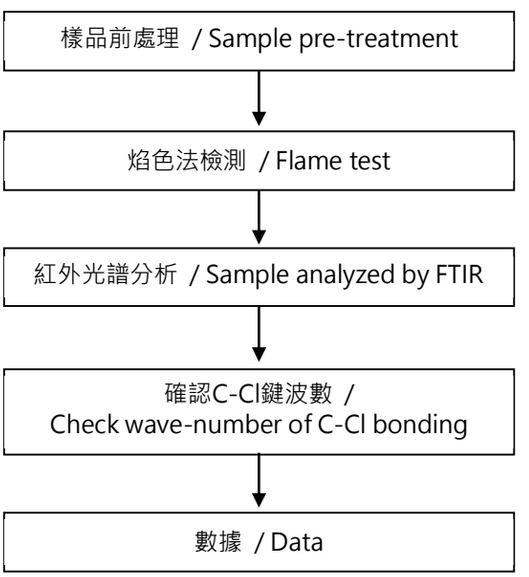
聚氯乙烯物質判定分析流程圖 / Analysis flow chart - PVC



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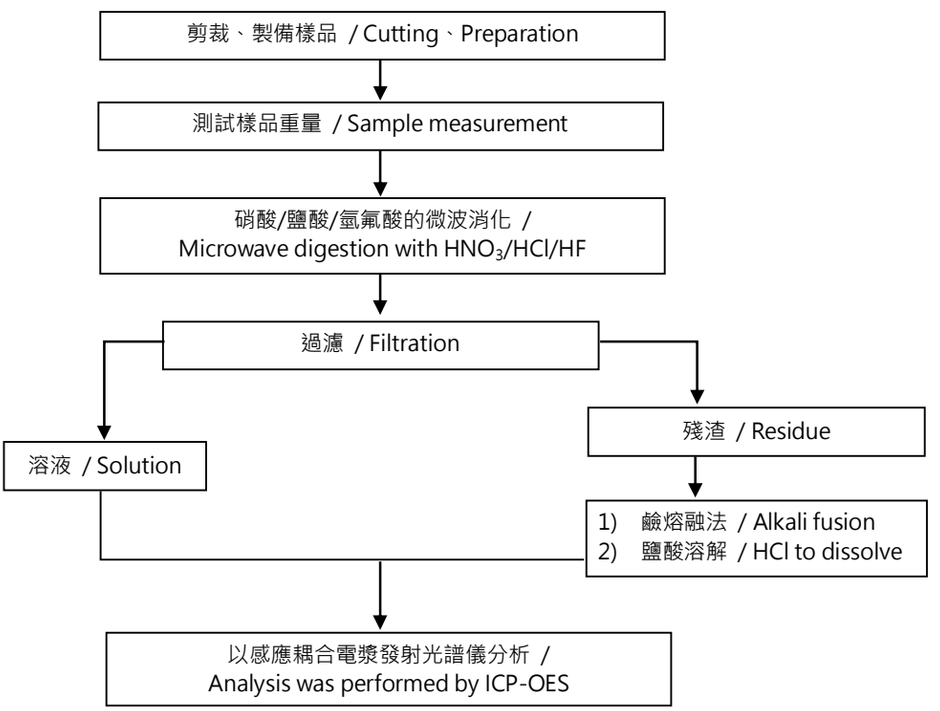
元素(含重金屬)分析流程圖 / Analytical flow chart of elements (Heavy metal included)

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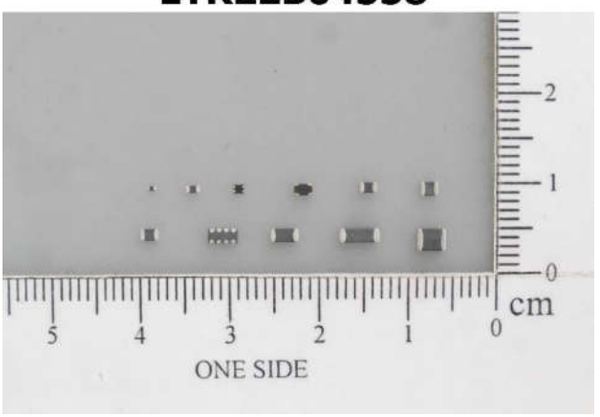
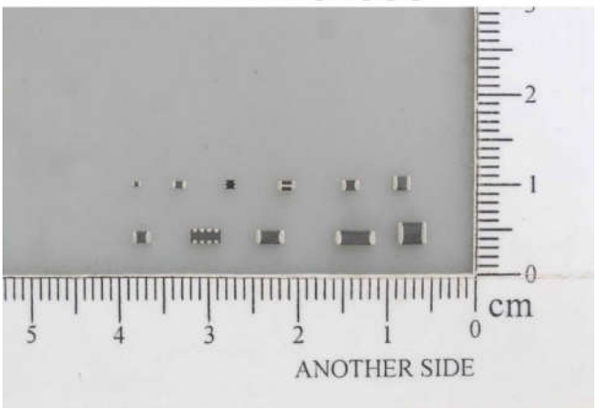
*** 照片中如有箭頭標示，則表示為實際檢測之樣品/部位. ***
(The tested sample / part is marked by an arrow if it's shown on the photo.)

ETR22B04558



ETR22B04558



** 報告結尾 (End of Report) **