

Multilayer Common Mode Choke Coils

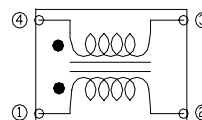
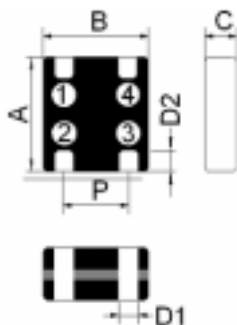
MCF1210NF2-900T01

1. Scope

This specification applies to Multilayer Common Mode Choke Coil, MCF Series Its Application is limited for the High speed differential transmission line like as followings.
 USB, LVDS, MIPI, MDDI, MHL, HDMI, DVI.



2. Dimensions



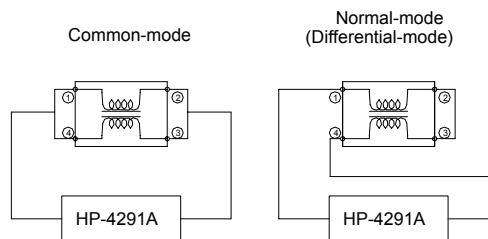
Chip Size						
Size	A	B	C	P	D1	D2
1210	1.25±0.15	1.0±0.15	0.55 ±0.10	0.55±0.10	0.30±0.10	0.25+0.15/-0.1

Units: mm

3. Part Numbering



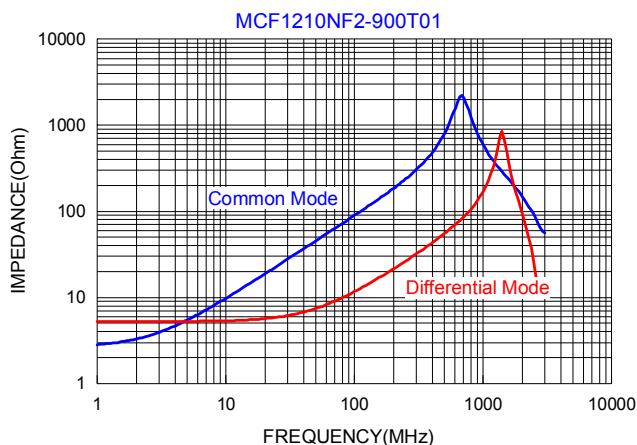
- A: Series
- B: Dimension A x B
- C: Material Lead Free Code
- D: Impedance Common Mode Impedance 900=90
- E: Packaging T=Taping and Reel , B=Bulk(Bags)
- F: Rated Current 01=100mA



4. Specification

Tai-Tech Part Number	Common Mode Impedance ()	Test Frequency (MHz)	Rated Voltage (Vdc) max.	Insulation Resistance (M) min.	DC Resistance () max.	Rated Current (mA) max.
MCF1210NF2-900T01	90±25%	100	5	100	4.5	100

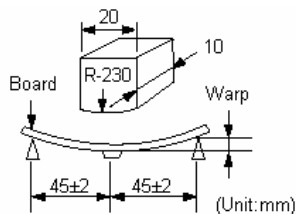
Impedance-Frequency Characteristics



5. Reliability and Test Condition

Item	Performance	Test Condition																			
Series No.	MCF	--																			
Operating Temperature	-40~+85 (Including self-generated heat)	--																			
Transportation Storage Temperature	-40~+85	For long storage conditions, please see the Application Notice																			
Impedance (Z)	Within the specified tolerance	Measuring equipment: 4291A or its equivalent Measuring jig: 16192A (or its equivalent)																			
Insulation Resistance		Measuring points: 1 to 2 or 3 to 4 Measuring voltage: Rated voltage																			
DC Resistance		Measuring points: 1 to 2 or 3 to 4																			
Rated Current																					
Vibration	Per table 1. <u>Table 1</u> <table border="1"> <tr> <td>Appearance</td> <td>No remarkable Defect</td> </tr> <tr> <td>Common Impedance change rate</td> <td>Within±20%</td> </tr> <tr> <td>Insulation resistance</td> <td>100mΩ min</td> </tr> </table>	Appearance	No remarkable Defect	Common Impedance change rate	Within±20%	Insulation resistance	100mΩ min	Test sample shall be soldered to test board and the test shall be conducted under the conditions shown in Table 2. <u>Table 2</u> <table border="1"> <tr> <td>Vibration frequency range</td> <td>10Hz to 55Hz</td> </tr> <tr> <td>Overall amplitude</td> <td>1.5mm</td> </tr> <tr> <td>1 cycle</td> <td>1min.(10 55 10Hz)</td> </tr> <tr> <td rowspan="3">Time</td> <td>X</td> <td>2 hours each</td> </tr> <tr> <td>Y</td> <td></td> </tr> <tr> <td>Z</td> <td></td> </tr> </table>	Vibration frequency range	10Hz to 55Hz	Overall amplitude	1.5mm	1 cycle	1min.(10 55 10Hz)	Time	X	2 hours each	Y		Z	
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Time	X	2 hours each																			
	Y																				
	Z																				
Solderability	More than 75% of terminal electrode shall be covered with fresh solder.	Test sample shall be immersed into molten solder under the conditions shown in Table 3 after immersed into flux. After this, test samples shall be taken out and visually checked. The speed for immersion and taking out shall be 25 mm/s. <u>Table 3</u> <table border="1"> <tr> <td>Solder temperature</td> <td>245 ±3</td> </tr> <tr> <td>Immersion time</td> <td>4s±1s</td> </tr> </table>	Solder temperature	245 ±3	Immersion time	4s±1s															
Solder temperature	245 ±3																				
Immersion time	4s±1s																				
Resistance to Soldering Heat	Per table 1.	Test sample shall be immersed into molten solder after immersed into flux and preheated under the conditions shown in Table 4. After this, test samples shall be taken out and measured after kept at room temperature for 2 to 3 hours.(Note 1) The speed for immersion and taking out shall be 25mm/s. <u>Table 4</u> <table border="1"> <tr> <td>Preheating</td> <td>150 , 3min.</td> </tr> <tr> <td>Resistance to Soldering Heat</td> <td>260 ±5</td> </tr> <tr> <td>Immersion time</td> <td>10s±0.5s</td> </tr> </table>	Preheating	150 , 3min.	Resistance to Soldering Heat	260 ±5	Immersion time	10s±0.5s													
Preheating	150 , 3min.																				
Resistance to Soldering Heat	260 ±5																				
Immersion time	10s±0.5s																				
Thermal Shock	Per table 1.	Steps 1 to 4 shown in Table 5 as one cycle shall be repeated 5 times. After the test, keep the test sample at a normal temperature with a normal humidity for 2 to 2 hours, then measurement shall be conducted.(Note 1) <u>Table 5</u> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature()</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40 +0/-3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Normal temp</td> <td>2-3</td> </tr> <tr> <td>3</td> <td>+85 +3/-0</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Normal temp</td> <td>2-3</td> </tr> </tbody> </table>	Step	Temperature()	Duration (min)	1	-40 +0/-3	30±3	2	Normal temp	2-3	3	+85 +3/-0	30±3	4	Normal temp	2-3				
Step	Temperature()	Duration (min)																			
1	-40 +0/-3	30±3																			
2	Normal temp	2-3																			
3	+85 +3/-0	30±3																			
4	Normal temp	2-3																			
Resistance to Humidity	Per table 1.	Test board shall be kept in a thermo hygrostat at temperature of 40 ±2 and relative humidity of 90% to 95% for 500+24/-0 hours. After the test, keep the test sample at a normal temperature with a normal humidity for 2 to 3 hours, then measurement shall be conducted.(Note 1)																			
High Temperature Load Life Test	Per table 1.	Test board shall be kept in a thermostatic oven with temperature of 85 ±2 for 500+24/-0 hours while supplying 1 to 2 and 3 -4 with rated current. After the test, keep the test sample at a normal temperature with a normal humidity for 2 to 3 hours, then measurement shall be conducted.(Note 1)																			

Item	Performance	Test Condition
High Temperature Life Test	Per table 1.	Test board shall be kept in an atmosphere with temperature of 85 ±2 for 500+24/-0 hours. After the test, keep the test sample at a normal temperature with a normal humidity for 2 to 3 hours, then measurement shall be conducted.(Note 1)
Bending Strength	Appearance: No mechanical damage.	Warp : 2mm(1210),1mm(0806) Testing board : Glass epoxy-resin substrate Thickness : 0.8mm



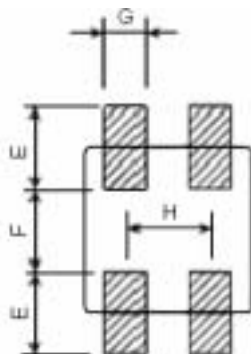
(Note 1) If question is found in the result of measurement, another measurement shall be conducted after test samples shall be kept for 48+/-2 hours.

6. Soldering and Mounting

6-1. Recommended PC Board Pattern

Type	Chip Size					Land Patterns For Reflow Soldering			
	A	B	C	D1	D2	E	F	G	H
0806	0.85±0.05	0.65±0.05	0.40 ±0.05	0.27±0.10	0.20+0.05/-0.1	0.25~0.35	0.25~0.35	0.25~0.35	0.5
1210	1.25±0.15	1.0±0.15	0.55 ±0.10	0.30±0.10	0.25+0.15/-0.1	0.45~0.55	0.7~0.8	0.25~0.35	0.55

Units: mm



PC board should be designed so that products can prevent damage from mechanical stress when warping the board. Products shall be positioned in the sideway direction against the mechanical stress to prevent failure.

6-2. Soldering

Mildly activated rosin fluxes are preferred. The 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.

Note.

If wave soldering is used ,there will be some risk.

Re-flow soldering temperatures below 240 degrees, there will be non-wetting risk

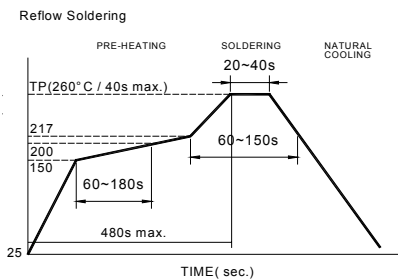
6-2.1 Lead Free Solder re-flow:

Recommended temperature profiles for lead free re-flow soldering in Figure 1.

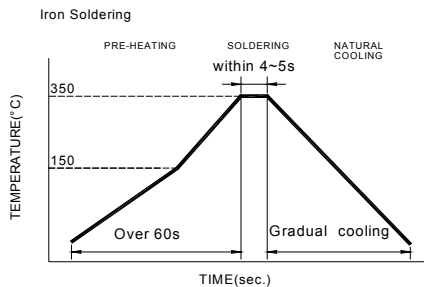
6-2.2 Soldering Iron:

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. for Iron Soldering in 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.



Reflow times: 3 times max
Fig.1

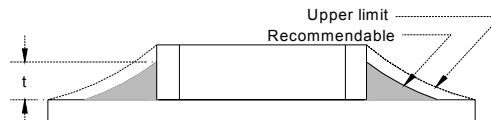


Iron Soldering times : 1 times max
Fig.2

6-2.3 Solder Volume:

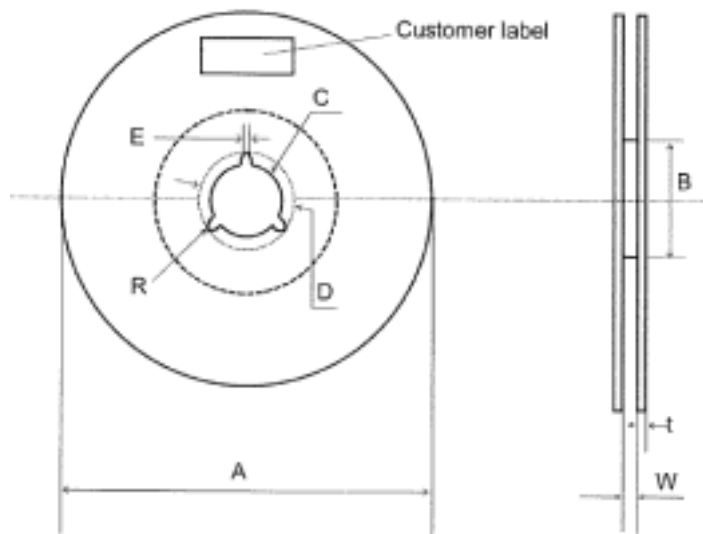
Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance. Solder shall be used not to be exceed as shown in right side:

Minimum fillet height = soldering thickness + 25% product height



7.Packaging Information

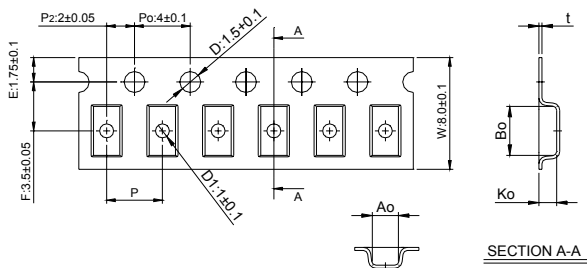
7-1. Reel Dimension



Code	A	B	C	D	E	W	t	R
Dimension	178±2.0	50 min	13±0.2	21±0.8	2.0±0.5	10±1.5	2.5 max	1.0

Units: mm

7-2. Tape Dimension (paper)



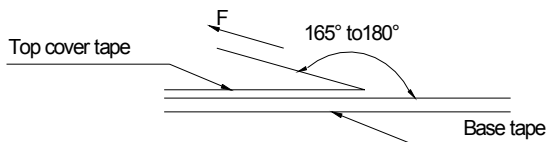
Series	Bo	Ao	Ko	P	t
0806	0.95±0.05	0.75±0.05	0.55±0.05	4.0±0.10	0.3 max
1210	1.40±0.05	1.15±0.05	0.65±0.05	4.0±0.10	0.3 max

Units: mm

7-3. Packaging Quantity

Chip size	0806	1210
Chip /Reel	10000	5000
Inner box	50000	25000
Middle box	250000	125000
Carton	500000	250000

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
 To maintain the solder ability of terminal electrodes:
 1. TAI-TECH products meet IPC/JEDEC J-STD-020D 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.

測試報告 Test Report

號碼(No.) : CE/2011/C1821 日期(Date) : 2011/12/16 頁數(Page) : 1 of 12

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(廣東省東莞市黃江鎮黃牛埔福祥街2號 / NO. 2, FUXIANG STREET, HUANGNIUPU, HUANGJIANG TOWN, DONGGUAN, GUANGDONG)

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以下測試樣品係由客戶送樣，且由客戶聲稱並經客戶確認如下 (The following samples was/were submitted and identified by/on behalf of the client as) :

樣品名稱(Sample Description) : FERRITE CHIP BEAD INDUCTOR ARRAY MCF MCM YMV SERIES
樣品型號(Style/Item No.) : FERRITE CHIP BEAD INDUCTOR ARRAY MCF MCM YMV SERIES
收件日期(Sample Receiving Date) : 2011/12/09
測試期間(Testing Period) : 2011/12/09 TO 2011/12/16

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


Chenyu Kung / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

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測試結果(Test Results)

測試部位(PART NAME)No.1 : 整體混測 (10款) (MIXED ALL PARTS (10 KINDS))

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				No.1
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
鉛 / Lead (Pb)	mg/kg	參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
汞 / Mercury (Hg)	mg/kg	參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	參考IEC 62321: 2008方法, 以UV-VIS檢測. / With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	參考US EPA 3540C: 1996方法, 以液相層析/質譜儀檢測全氟辛烷磺酸含量. / With reference to US EPA 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS.	10	n.d.
全氟辛酸(銨) / PFOA (CAS No.: 335-67-1)	mg/kg	參考US EPA 3540C: 1996方法, 以液相層析/質譜儀檢測全氟辛酸(銨)含量. / With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS.	10	n.d.

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測試報告

Test Report

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				No.1
六溴環十二烷 / Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4)	mg/kg	參考US EPA 3540C方法, 以氣相層析/質譜儀檢測。 / With reference to US EPA 3540C method. Analysis was performed by GC/MS.	5	n.d.
鄰苯二甲酸甲苯基丁酯 / BBP (Benzyl butyl phthalate) (CAS No.: 85-68-7)	%	參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二(2-乙基己基)酯 / DEHP (Di-(2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	%	參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二異癸酯 / DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0)	%	參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄰苯二甲酸二異壬酯 / DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0)	%	參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	%	參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	%	參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.

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測試報告 Test Report

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				No.1
多溴聯苯總和 / Sum of PBBs	mg/kg	參考IEC 62321: 2008方法, 以氣相層析儀/ 質譜儀檢測。 / With reference to IEC 62321: 2008 and performed by GC/MS.	-	n.d.
一溴聯苯 / Monobromobiphenyl			5	n.d.
二溴聯苯 / Dibromobiphenyl			5	n.d.
三溴聯苯 / Tribromobiphenyl			5	n.d.
四溴聯苯 / Tetrabromobiphenyl			5	n.d.
五溴聯苯 / Pentabromobiphenyl			5	n.d.
六溴聯苯 / Hexabromobiphenyl			5	n.d.
七溴聯苯 / Heptabromobiphenyl			5	n.d.
八溴聯苯 / Octabromobiphenyl			5	n.d.
九溴聯苯 / Nonabromobiphenyl			5	n.d.
十溴聯苯 / Decabromobiphenyl			5	n.d.
多溴聯苯醚總和 / Sum of PBDEs			-	n.d.
一溴聯苯醚 / Monobromodiphenyl ether			5	n.d.
二溴聯苯醚 / Dibromodiphenyl ether			5	n.d.
三溴聯苯醚 / Tribromodiphenyl ether			5	n.d.
四溴聯苯醚 / Tetrabromodiphenyl ether			5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether			5	n.d.
六溴聯苯醚 / Hexabromodiphenyl ether			5	n.d.
七溴聯苯醚 / Heptabromodiphenyl ether			5	n.d.
八溴聯苯醚 / Octabromodiphenyl ether			5	n.d.
九溴聯苯醚 / Nonabromodiphenyl ether	5	n.d.		
十溴聯苯醚 / Decabromodiphenyl ether	5	n.d.		

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Test Report

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

備註(Note) :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. "-" = Not Regulated (無規格值)
5. 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 samples was/were analyzed on behalf of the applicant as mixing sample in one testing. The above results was/were only given as the informality value.)

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PFOS參考資訊(Reference Information) : 指令 2006/122/EC (Directive 2006/122/EC)

- (1) 該物質不可置於市場上或使用於特殊物質或配置成分重量濃度等於或大於0.005%.

(May not be placed on the market or used as a substance or constituent of preparations in a concentration equal to or higher than 0.005% by mass.)

- (2) 該物質不可置於市場上的半成品或商品或其物件; 假若零件上明顯地具有PFOS並參照結構上及微細構造上計算PFOS重量濃度等於或大於0.1%, 而紡織品或其他覆蓋物質, 如果PFOS在覆蓋物質中含量等於或大於 $1\mu\text{g}/\text{m}^2$.

(May not be placed on the market in semi-finished products or articles, or parts thereof, if the concentration of PFOS is equal to or higher than 0.1% by mass calculated with reference to the mass of structurally or microstructurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than $1\mu\text{g}/\text{m}^2$ of the coated material.)

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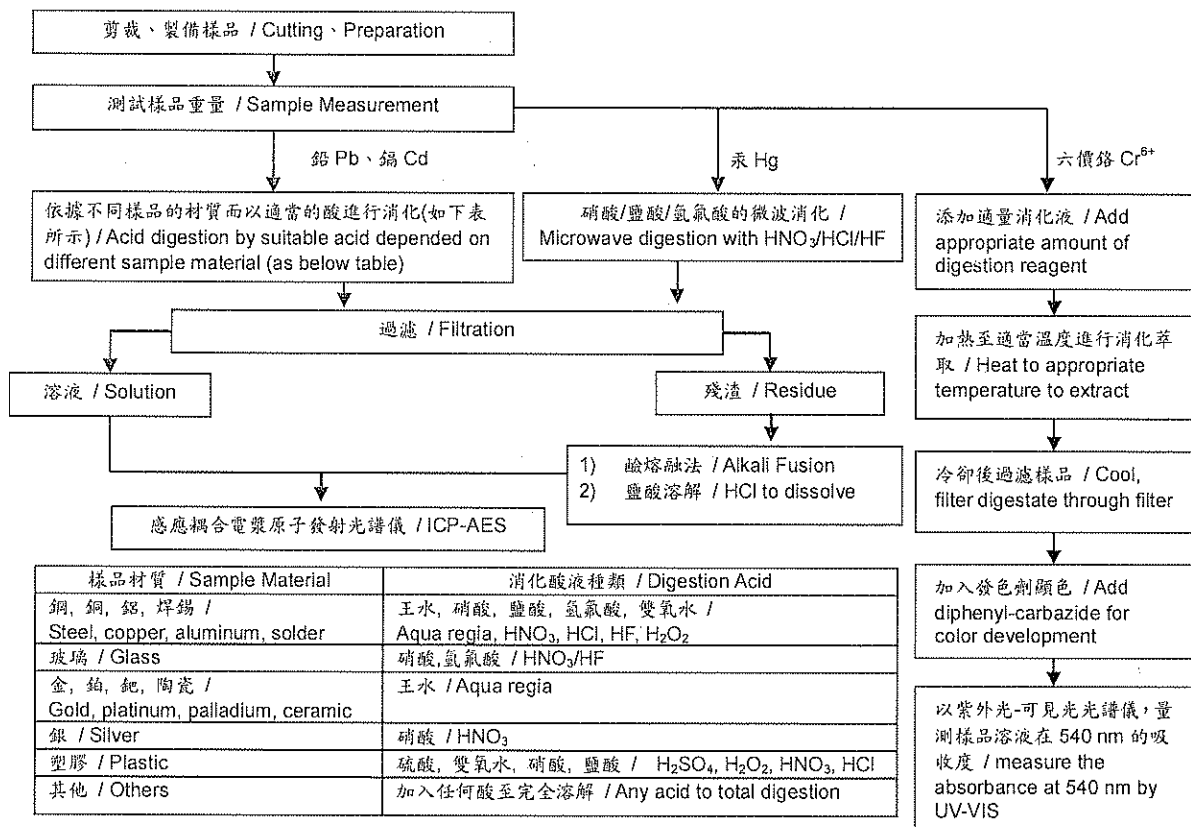
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- 1) 根據以下的流程圖之條件，樣品已完全溶解。(六價鉻測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)
- 2) 測試人員：楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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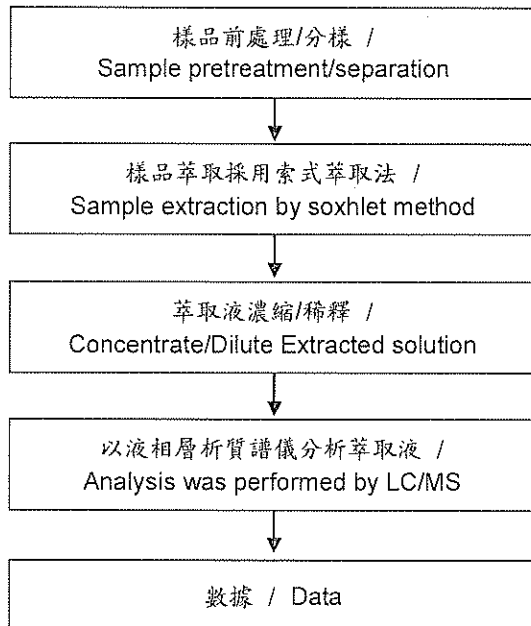
索式萃取分析流程圖 /

Analytical flow chart of Soxhlet extraction (LC/MS) procedure

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

【測試項目：全氟辛酸磺酸/全氟辛酸(銨)、苯並三唑類化合物 /

Test Items: PFOS/PFOA、Benzotriazole】



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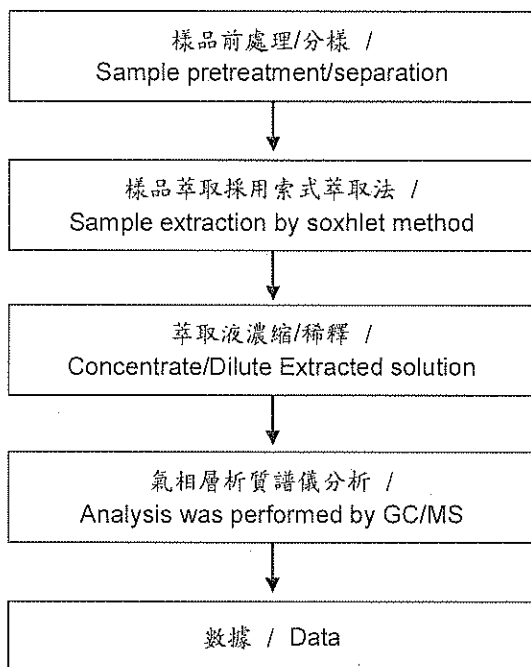
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索式萃取分析流程圖 / Analytical flow chart of Soxhlet extraction (GC/MS) procedure

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

【測試項目：可塑劑、苯並三唑類化合物、六溴環十二烷、壬酚、單甲基二溴二苯基甲烷、有機磷化合物 / Test Items: Phthalate、Benzotriazole、HBCDD、NP、DBBT、Organic phosphorus compounds】



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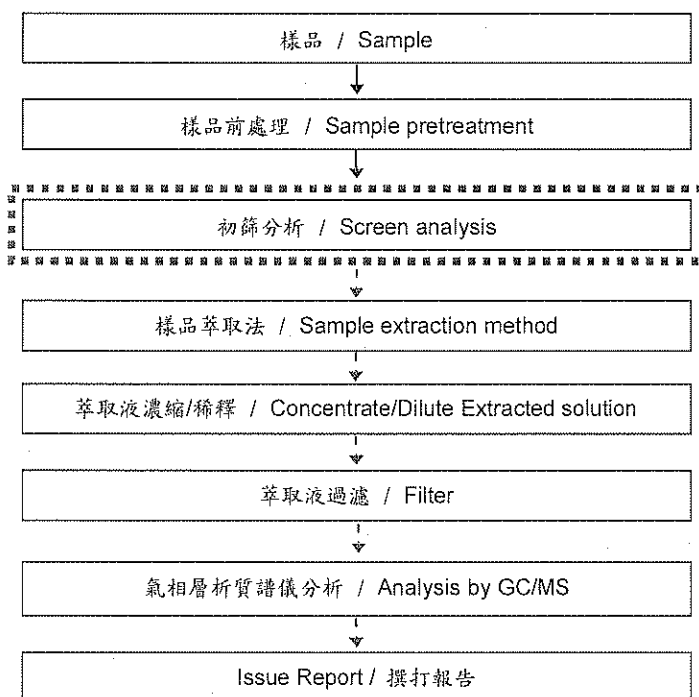
分析流程圖 / Analytical flow chart

■ 測試人員: 翁賜彬 / Name of the person who made measurement: Roman Wong

■ 測試負責人: 張啓興 / Name of the person in charge of measurement: Troy Chang

【測試項目(Test Items): 多溴聯苯/多溴聯苯醚、四溴雙酚-A-雙 / PBB/PBDE, TBBP-A-bis】

初次測試程序 / First testing process → 選擇性篩檢程序 / Optional screen process 確認程序 / Confirmation process -->



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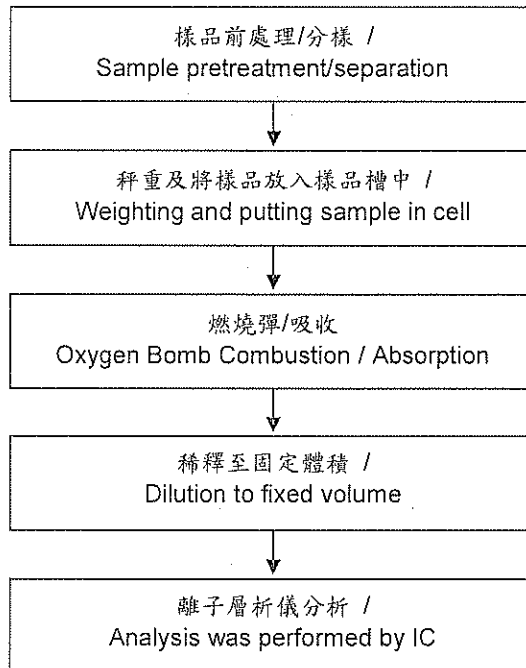
桃園縣楊梅市幼獅工業區幼四路1之1號 / NO. 1, YOU 4TH ROAD, YOUTH INDUSTRIAL DISTRICT, YANG-MEI CITY, TAO-YUAN HSIEN, TAIWAN, R. O. C.)

(廣東省東莞市黃江鎮黃牛埔福祥街2號 / NO. 2, FU XIANG STREET, HUANGNIUPU, HUANGJIANG TOWN, DONGGUAN, GUANGDONG)

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

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



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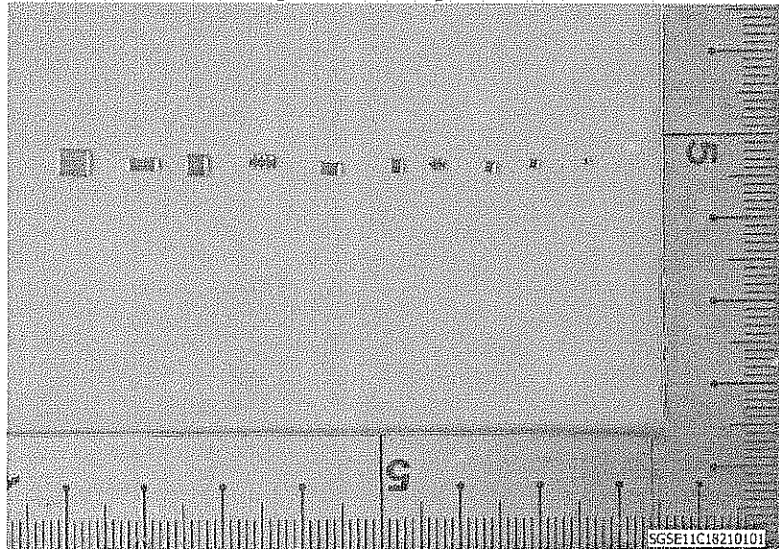
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* 照片中如有箭頭標示，則表示為實際檢測之樣品/部位。*

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

CE/2011/C1821



** 報告結尾 (End of Report) **

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