

Test Report 測試報告

Applicant: TA-I TECHNOLOGY CO., LTD.
申請廠商 大毅科技股份有限公司
No. 4, Ln. 17, Sec. 3, Nanshan Rd.,
Luzhu District, Taoyuan City 338,
Taiwan
桃園市蘆竹區南山路三段 17 巷 4 號

Number : TWNC0135861501
報告號碼

Issue Date : May 12, 2025
報告發行日期

Sample Description 樣品敘述:

One (1) Group of Submitted Samples Said To Be :

以下測試樣品乃供應商所提供及確認:

Sample Description : Thick Film Chip Arrays Series (Totally Lead Free)

樣品名稱

Style / Item No. : CNXXW22/CNXXW24/CNXXW34 Series, CNF24 Series

產品型號

Date Sample Received : Apr 22, 2025

收件日期

Date Test Started : Apr 22, 2025

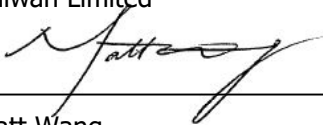
開始測試日期

Test Conducted 測試執行:

As requested by the applicant, for details please refer to attached pages.

依申請商之要求, 細節請參考附頁.

Authorized By:
On behalf of Intertek Testing Services
Taiwan Limited



Matt Wang
General Manager



Signed by:



Thomas Chou
Manager



報告查詢 Report Verification



Test Conducted 測試內容 :

Test Result Summary 測試結果 :

Test Item 測試項目	Unit 單位	Test Method 測試方法	Result 結果	MDL
			Mixed all kinds of submitted samples(#)	
Heavy Metal 重金屬				
Cadmium (Cd) Content 鎘含量	ppm	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES. 參考 IEC 62321-5: 2013, 以微波或酸液消化法消化樣品並用感應耦合電漿原子發射光譜儀分析。	ND	2
Lead (Pb) Content 鉛含量	ppm	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES. 參考 IEC 62321-5: 2013, 以微波或酸液消化法消化樣品並用感應耦合電漿原子發射光譜儀分析。	ND	2
Mercury (Hg) Content 汞含量	ppm	With reference to IEC 62321-4:2013+AMD1:2017, by microwave or acid digestion and determined by ICP-OES. 參考 IEC 62321-4:2013+AMD1:2017, 以微波或酸液消化法消化樣品並用感應耦合電漿原子發射光譜儀分析。	ND	2
Arsenic (As) Content 砷含量	ppm	With reference to USEPA 3052, by microwave digestion and determined by ICP-OES. 參考 USEPA 3052, 以微波消化法並用感應耦合電漿原子發射光譜儀分析。	ND	2
Beryllium (Be) Content 鈹含量	ppm	With reference to USEPA 3052, by microwave digestion and determined by ICP-OES. 參考 USEPA 3052, 以微波消化法並用感應耦合電漿原子發射光譜儀分析。	ND	2
Antimony (Sb) Content 銻含量	ppm	With reference to USEPA 3052, by microwave digestion and determined by ICP-OES. 參考 USEPA 3052, 以微波消化法並用感應耦合電漿原子發射光譜儀分析。	ND	2



Test Conducted 測試內容 :

Test Item 測試項目	Unit 單位	Test Method 測試方法	Result 結果	
			Mixed all kinds of submitted samples(#)	MDL
Heavy Metal 重金屬				
Chromium VI (Cr(VI)) Content 六價鉻含量	ppm	With reference to IEC 62321-7-2: 2017, organic solvent was used to dissolve or swell sample matrix, followed by alkaline digestion and determined by UV-Vis Spectrophotometer. 參考 IEC 62321-7-2:2017，以有機溶劑溶解或使樣品基質膨脹，再進行鹼液消化，用紫外光-可見光分光光度計分析。	ND	8
Polybrominated Biphenyls (PBBs) 多溴聯苯				
Monobrominated Biphenyls (MonoBB) 單溴聯苯	ppm	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary. 參考 IEC 62321-6: 2015，以溶劑萃取並用氣相層析質譜儀分析，必要時會以高效液相層析儀光二極體陣列偵測儀進行確認。	ND	5
Dibrominated Biphenyls (DiBB) 二溴聯苯	ppm		ND	5
Tribrominated Biphenyls (TriBB) 三溴聯苯	ppm		ND	5
Tetrabrominated Biphenyls (TetraBB) 四溴聯苯	ppm		ND	5
Pentabrominated Biphenyls (PentaBB) 五溴聯苯	ppm		ND	5
Hexabrominated Biphenyls (HexaBB) 六溴聯苯	ppm		ND	5
Heptabrominated Biphenyls (HeptaBB) 七溴聯苯	ppm		ND	5
Octabrominated Biphenyls (OctaBB) 八溴聯苯	ppm		ND	5
Nonabrominated Biphenyls (NonaBB) 九溴聯苯	ppm		ND	5
Decabrominated Biphenyl (DecaBB) 十溴聯苯	ppm		ND	5



Test Conducted 測試內容 :

Test Item 測試項目	Unit 單位	Test Method 測試方法	Result 結果	MDL
			Mixed all kinds of submitted samples(#)	
Polybrominated Diphenyl Ethers (PBDEs) 多溴聯苯醚				
Monobrominated Diphenyl Ethers (MonoBDE) 單溴聯苯醚	ppm	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary. 參考 IEC 62321-6: 2015, 以溶劑萃取並用氣相層析質譜儀分析, 必要時會以高效液相層析儀光二極體陣列偵測儀進行確認。	ND	5
Dibrominated Diphenyl Ethers (DiBDE) 二溴聯苯醚	ppm		ND	5
Tribrominated Diphenyl Ethers (TriBDE) 三溴聯苯醚	ppm		ND	5
Tetrabrominated Diphenyl Ethers (TetraBDE) 四溴聯苯醚	ppm		ND	5
Pentabrominated Diphenyl Ethers (PentaBDE) 五溴聯苯醚	ppm		ND	5
Hexabrominated Diphenyl Ethers (HexaBDE) 六溴聯苯醚	ppm		ND	5
Heptabrominated Diphenyl Ethers (HeptaBDE) 七溴聯苯醚	ppm		ND	5
Octabrominated Diphenyl Ethers (OctaBDE) 八溴聯苯醚	ppm		ND	5
Nonabrominated Diphenyl Ethers (NonaBDE) 九溴聯苯醚	ppm		ND	5
Decabrominated Diphenyl Ether (DecaBDE) 十溴聯苯醚	ppm		ND	5
Phthalates 鄰苯二甲酸酯				
Di(2-ethylhexyl) Phthalate (DEHP) 鄰苯二甲酸二(2-乙基己基)酯	ppm	With reference to IEC 62321-8:2017, by solvent extraction and determined by GC-MS. 參考 IEC 62321-8:2017, 以溶劑萃取並用氣相層析質譜儀分析。	ND	50
Dibutyl Phthalate (DBP) 鄰苯二甲酸二丁酯	ppm		ND	50
Benzyl Butyl Phthalate (BBP) 鄰苯二甲酸苯基丁酯	ppm		ND	50
Di-(Iso-Nonyl) Phthalate (DINP) 鄰苯二甲酸二異壬酯	ppm		ND	50
Di-(Iso-Decyl) Phthalate (DIDP) 鄰苯二甲酸二異癸酯	ppm		ND	50
Di-(N-Octyl) Phthalate (DNOP) 鄰苯二甲酸二辛酯	ppm		ND	50
Diisobutyl Phthalate (DIBP) 鄰苯二甲酸二異丁酯	ppm		ND	50
Di-n-pentyl phthalate (DPP, DnPP) 鄰苯二甲酸二戊酯	ppm		ND	50
Di-n-hexyl phthalate (DnHP) 鄰苯二甲酸二正己酯(二己酯)	ppm		ND	50
Bis(2-Methoxyethyl) phthalate (DMEP) 鄰苯二甲酸二(2-乙基甲醚)酯	ppm		ND	50



Test Conducted 測試內容 :

Test Item 測試項目	Unit 單位	Test Method 測試方法	Result 結果	
			Mixed all kinds of submitted samples(#)	MDL
Polycyclic Aromatic Hydrocarbons (PAHs) 多環芳香族化合物				
Naphthalene 萘	ppm	With reference to AfPS GS 2019:01 PAK, by solvent extraction and determined by GC-MS. 參考 AfPS GS 2019:01 PAK，以溶劑萃取並以氣相層析質譜儀分析。	ND	0.2
Phenanthrene 菲 (Δ)	ppm		ND	0.2
Anthracene 蒽 (Δ)	ppm		ND	0.2
Fluoranthene 芴 (Δ)	ppm		ND	0.2
Pyrene 芘 (Δ)	ppm		ND	0.2
Chrysene 蒽	ppm		ND	0.2
Benzo[a]anthracene 苯并[a]蒽	ppm		ND	0.2
Benzo[b]fluoranthene 苯并[b]芴	ppm		ND	0.2
Benzo[k]fluoranthene 苯并[k]芴	ppm		ND	0.2
Benzo[j]fluoranthene 苯并[j]芴	ppm		ND	0.2
Benzo[a]pyrene 苯并[a]芘	ppm		ND	0.2
Benzo[e]pyrene 苯并[e]芘	ppm		ND	0.2
Indeno[1,2,3-cd]pyrene 芘并[1,2,3-cd]芘	ppm		ND	0.2
Dibenzo[a,h]anthracene 二苯并[a,h]蒽	ppm		ND	0.2
Benzo[g,h,i]perylene 苯并[g,h,i]芘	ppm		ND	0.2
Sum of PAHs marked with (Δ) 標示(Δ)之化合物總和	ppm	ND	--	
Sum of 15 PAHs 15 支 PAHs 總和	ppm	ND	--	
Halogen Content 鹵素含量				
Fluorine (F) 氟	ppm	With reference to EN 14582:2016 by combustion bomb with oxygen and determined by Ion Chromatography. 參考 EN 14582:2016，以氧彈燃燒集氣法並用離子層析儀分析。	ND	50
Chlorine (Cl) 氯	ppm		ND	50
Bromine (Br) 溴	ppm		ND	50
Iodine (I) 碘	ppm		ND	50



Test Conducted 測試內容 :

Test Item 測試項目	Unit 單位	Test Method 測試方法	Result 結果	MDL
			Mixed all kinds of submitted samples(#)	
Others 其他				
Polychlorinated Biphenyls (PCBs) 多氯聯苯	ppm	With reference to USEPA 3540C, by solvent extraction and determined by GC-ECNI-MS. 參考 USEPA 3540C，以溶劑萃取並用氣相層析-化學游離質譜儀分析。	ND	1
Hexabromocyclododecane (HBCDD) 六溴環十二烷	ppm	With reference to USEPA 3540C, by solvent extraction and determined by GC-MS. 參考 USEPA 3540C，以溶劑萃取並用氣相層析質譜儀分析。	ND	10
Perfluorooctane Sulfonates Including PFOS, PFOSA, N-Me-FOSA, N-Et-FOSA, N-Me-FOSE, N-Et-FOSE 全氟辛磺酸含 PFOS, PFOSA, N-Me-FOSA, N-Et-FOSA, N-Me-FOSE, N-Et-FOSE	ppm	With reference to CEN/TS 15968:2010, by solvent extraction and determined by LC-MS-MS. 參考 CEN/TS 15968:2010，以溶劑萃取並用液相層析串聯質譜儀分析。	ND	0.01
Perfluorooctanoic Acid (PFOA) 全氟辛酸	ppm	With reference to CEN/TS 15968:2010, by solvent extraction and determined by LC-MS-MS. 參考 CEN/TS 15968:2010，以溶劑萃取並用液相層析串聯質譜儀分析。	ND	0.01



Test Conducted 測試內容 :

Test Item 測試項目	Unit 單位	Test Method 測試方法	Result 結果	MDL
			CNF24	
Polyvinyl Chloride (PVC) 聚氯乙烯	NA	By Beilstein's test (Flame Test) and FT-IR analysis. 以火焰法及傅立葉轉換紅外線光譜儀檢測。	Negative	NA

Remarks: ppm = Parts per million based on weight of tested sample = mg/kg
備註 百萬分之一，依據測試樣品重量計算 = 毫克/公斤

ND = Not detected 未檢測出

MDL = Quantitation limit of test method 方法偵測極限

NA = Not applicable 不適用

= Test results were for reference only and might not represent the real content in each component as the composite sampling procedure was according to the special request of client. Please be noted the fewer components are mixed up, the better representation of sampling will get.
依據客戶要求進行混合測試，故本測試結果僅供參考，且該混測結果不一定能代表各分測結果。請注意混測數量越少，各樣品取樣代表性會越佳。

Responsibility of Chemist 分析人員 : Andy Yu/ Vita Fu

Date Sample Received 樣品收件日期 : Apr 22, 2025
Test Period 樣品測試期間 : Apr 22, 2025 to May 02, 2025

RoHS Limit RoHS 限值

Restricted Substances 限用物質	Limits 限值
Cadmium (Cd) content 鎘含量	0.01% (100ppm)
Lead (Pb) content 鉛含量	0.1% (1000ppm)
Mercury (Hg) content 汞含量	0.1% (1000ppm)
Chromium VI (Cr(VI)) content 六價鉻含量	0.1% (1000ppm)
Polybrominated Biphenyls (PBBs) 多溴聯苯	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs) 多溴聯苯醚	0.1% (1000ppm)
Di(2-ethylhexyl) Phthalate (DEHP) 鄰苯二甲酸二(2-乙基己基)酯	0.1% (1000ppm)
Dibutyl Phthalate (DBP) 鄰苯二甲酸二丁酯	0.1% (1000ppm)
Benzyl Butyl Phthalate (BBP) 鄰苯二甲酸苯基丁酯	0.1% (1000ppm)
Diisobutyl Phthalate (DIBP) 鄰苯二甲酸二異丁酯	0.1% (1000ppm)

The limits were quoted from Annex II of 2011/65/EU and Amendment (EU) 2015/863 for homogeneous material.
本限值是依據歐盟指令 2011/65/EU 及其更新指令(EU) 2015/863 之附錄二針對均質材質所訂定。



Test Conducted 測試內容 :

PAHs Limit PAHs 限值(AFPS GS 2019:01 PAK)

Parameter 分類	Category 1 第一類	Category 2 第二類		Category 3 第三類	
Product 產品	Materials intended to be put into the mouth, or materials in toys according to Directive 2009/48/EC, or materials in articles for use by children up to three years of age with long-term skin contact (longer than 30s) when used as intended 意圖放入口中的材料或者長時間接觸皮膚(超過 30 秒)的 2009/48/EC 定義的玩具材料和 3 歲以下兒童使用的產品	Materials that are not covered by Category 1, with long-term skin contact (longer than 30s) or repeated short-term skin contact if used as intended or foreseeable 除了類別 1 之外，可預見的超過 30 秒的皮膚接觸（長期皮膚接觸）或者重複的短時間接觸		Materials that are not covered by Category 1 or 2, with short-term skin contact (up to 30 s) when used as intended or foreseeable 除了類別 1 和 2 之外，可預見的不超過 30 秒的皮膚接觸（短期皮膚接觸）	
		Use by children under 14 years old 供 14 歲以下兒童使用的產品(2A)	Other consumer products 其它產品 (2B)	Use by children under 14 years old(3A) 供 14 歲以下兒童使用的產品(3A)	Other consumer products 其它產品 (3B)
Naphthalene 萘	< 1	< 2		< 10	
Phenanthrene 菲	< 1 (Sum)	< 5 (Sum)	< 10 (Sum)	< 20 (Sum)	< 50 (Sum)
Anthracene 蒽					
Fluoranthene 芘					
Pyrene 芘					
Chrysene 蒽	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[a]anthracene 苯并[a]蒽	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[b]fluoranthene 苯并[b]芘	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[k]fluoranthene 苯并[k]芘	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[j]fluoranthene 苯并[j]芘	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[a]pyrene 苯并[a]芘	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[e]pyrene 苯并[e]芘	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno[1,2,3-cd]pyrene 茚并[1,2,3-cd]芘	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo[a,h]anthracene 二苯并[a,h]蒽	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[g,h,i]perylene 苯并[g,h,i]芘	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Sum Of 15 PAHs	< 1	< 5	< 10	< 20	< 50

Unit 單位 : mg/kg

Remarks: "repeated short-term skin contact" according to REACH Annex XVII No. 50 addition regulation (EC) No. 1272/2013
備註 "短期重複與皮膚接觸" 是依據 REACH 法規(EC) No.1272/2013 附錄 XVII 第 50 項

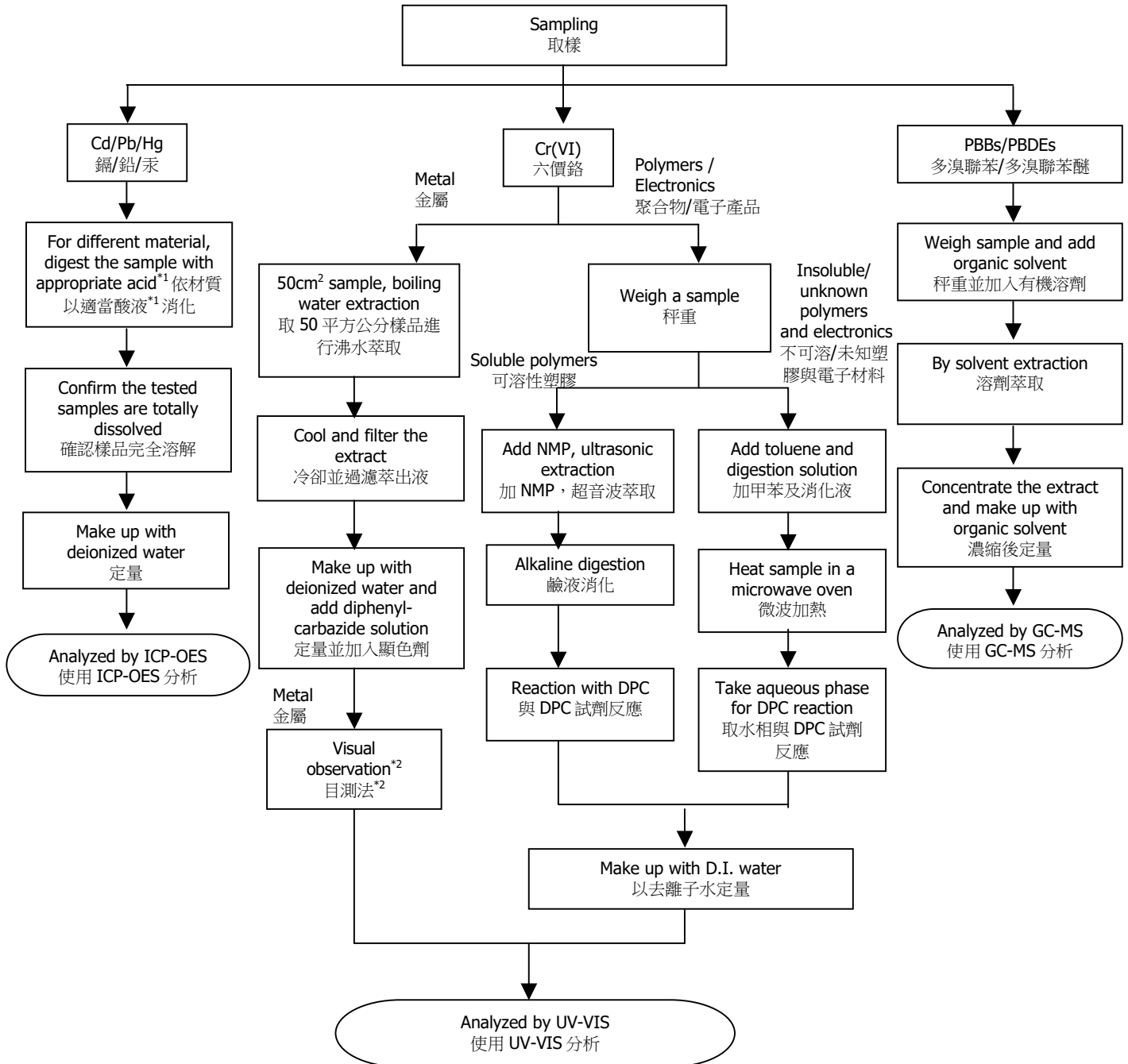


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Cd/Pb/Hg/Chromium (VI)/PBBs/PBDEs Content RoHS 六項測試

Reference Method 參考方法 : Cd/Pb: IEC 62321-5:2013; Hg: IEC 62321-4:2013+AMD1:2017;
Chromium (VI): IEC 62321-7-1:2015 (boiling water extraction);
Chromium (VI): IEC 62321-7-2:2017 (solvent and alkaline extraction);
PBBs/PBDEs: IEC 62321-6:2015



Test Conducted 測試內容 :

Remarks 備註:

*1: List of Appropriate Acid 各材質添加酸液如下表 :

Material 材質	Acid Added for Digestion 添加酸液種類
Polymers 聚合物	HNO ₃ , HCl, HF, H ₂ O ₂ , H ₃ BO ₃ 硝酸、鹽酸、氫氟酸、雙氧水、硼酸
Metals 金屬	HNO ₃ , HCl, HF 硝酸、鹽酸、氫氟酸
Electronics 電子產品	HNO ₃ , HCl, H ₂ O ₂ , HBF ₄ 硝酸、鹽酸、雙氧水、氟硼酸

*2: If sample solution is significantly more intense than 0.13 µg/cm² equivalent comparison standard, Chromium VI would be determined as detected, the result of visual observation is positive.

當待測樣品溶液顏色明顯比 0.13 µg/cm² 深，採用目測法判定六價鉻結果為陽性。

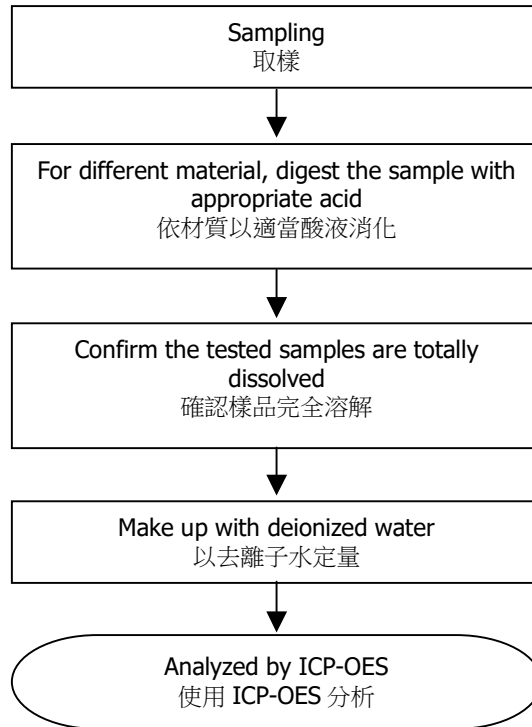


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Heavy Metal (As,Sb,Be) Contents 重金屬(砷,銻,鉍)

Reference Method 參考方法 : USEPA 3052

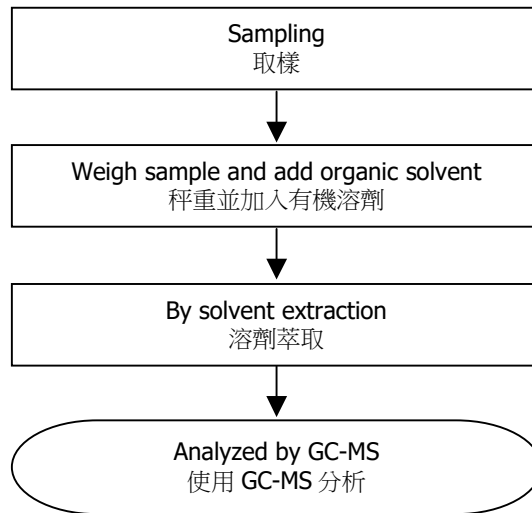


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Phthalates Content 鄰苯二甲酸酯測試

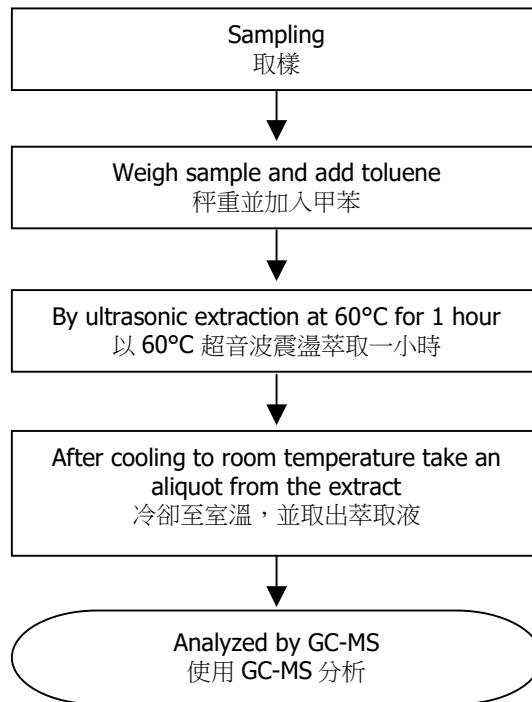
Reference Method 參考方法 : IEC 62321-8:2017



Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Polycyclic Aromatic Hydrocarbons (PAHs) Content 多環芳香族化合物測試
Reference Method 參考方法 : AfPS GS 2019:01 PAK

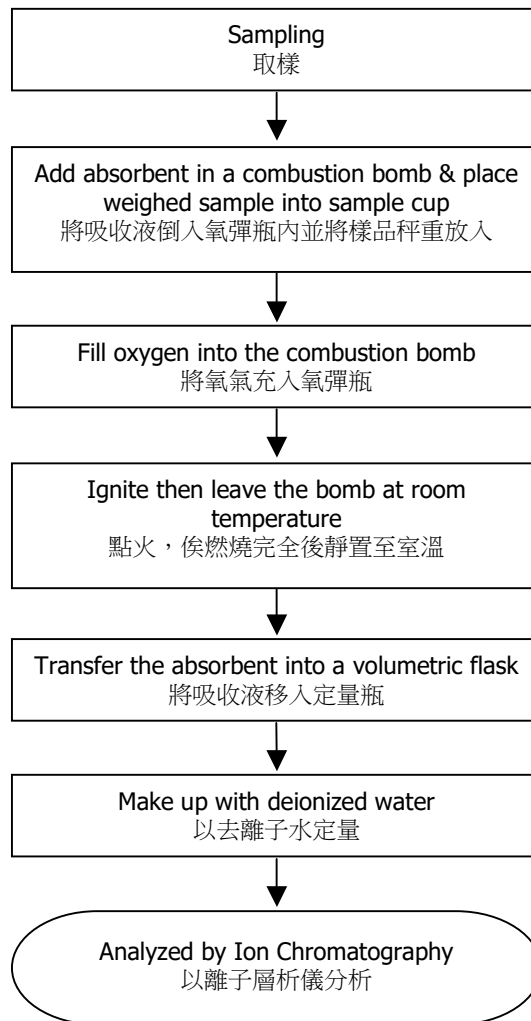


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Halogen Content 鹵素測試

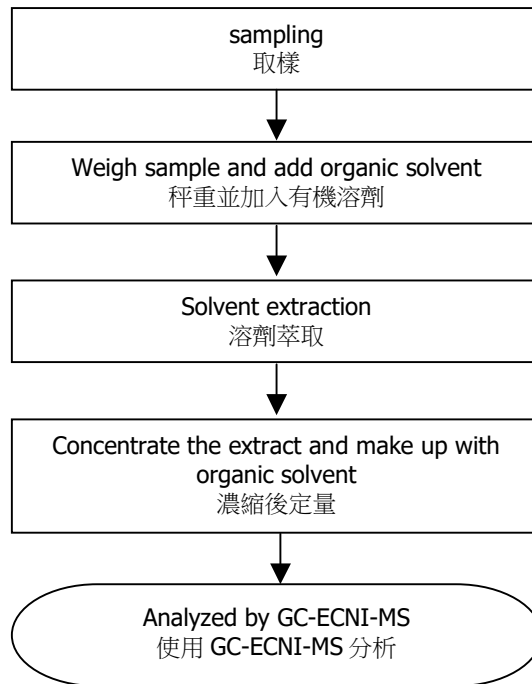
Reference Method 參考方法 : EN 14582:2016



Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Polychlorinated Biphenyls (PCBs) Content 多氯聯苯測試
Reference Method 參考方法 : USEPA 3540C

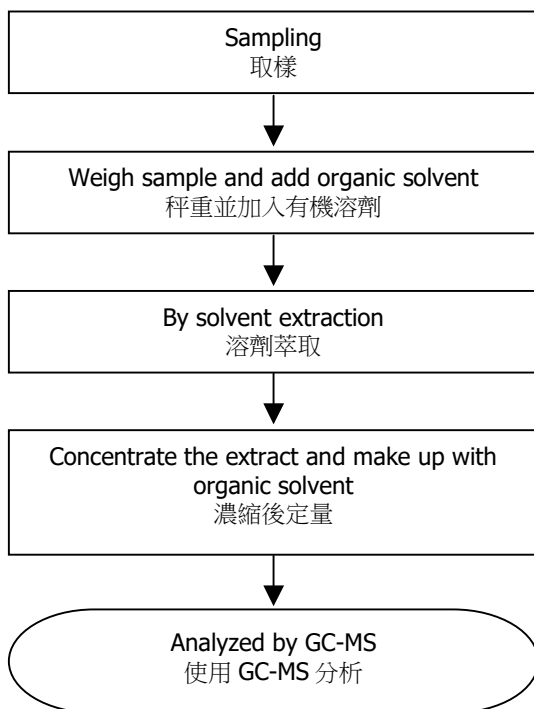


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Hexabromocyclododecane (HBCDD) 六溴環十二烷測試

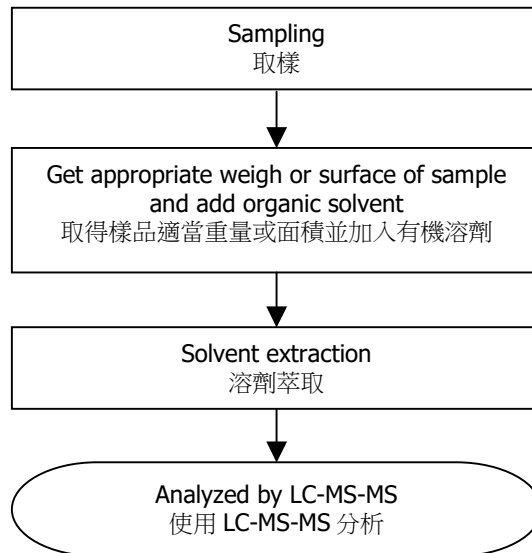
Reference Method 參考方法 : USEPA 3540C



Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Perfluorooctane Sulfonates (PFOS) / Perfluorooctanoic Acid (PFOA) Content 全氟辛磺酸 / 全氟辛酸測試
Reference Method 參考方法 : CEN/TS 15968:2010

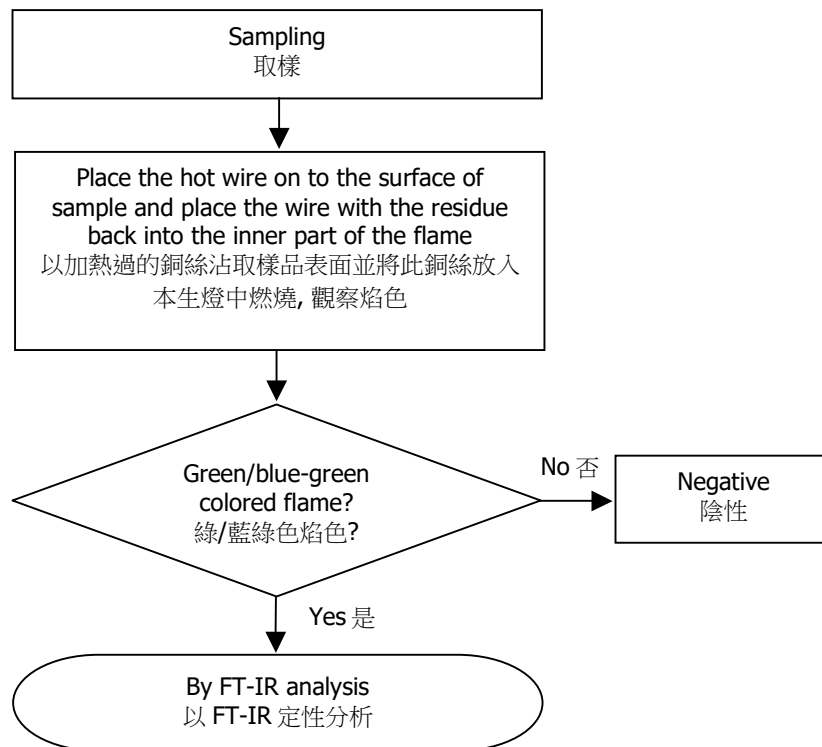


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Polyvinyl Chloride (PVC) 聚氯乙烯測試

Reference Method 參考方法 : Beilstein's Test (Flame Test) / FT-IR Analysis



Sample photo 樣品照片 :



End of Report

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