

## Test Report 測試報告

Applicant 申請廠商: TA-I TECHNOLOGY CO., LTD.  
No. 26, Lane 470, Sec. 2,  
Nan-Shan Rd., Luzhu Dist.,  
Taoyuan City, Taiwan

Number : TWNC00625329  
報告號碼

Date 日期 : Aug 21, 2017

### 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 : RESISTIVE PASTE

樣品名稱

Style / Item No. : T97G1216

產品型號

Date Sample Received : Aug 03, 2017

收件日期

Date Test Started : Aug 03, 2017

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  
Sr. Manager



Page 1 of 14



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	RL
			Black paste	
<b>Heavy Metal 重金屬</b>				
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。	41	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
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
Chromium VI (Cr <sup>6+</sup> ) 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



Test Conducted 測試內容 :

Test Item 測試項目	Unit 單位	Test Method 測試方法	Result 結果	RL
			Black paste	
<b>Polybrominated Biphenyls (PBBs) 多溴聯苯</b>				
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
<b>Polybrominated Diphenyl Ethers (PBDEs) 多溴聯苯醚</b>				
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



Test Conducted 測試內容 :

Test Item 測試項目	Unit 單位	Test Method 測試方法	Result 結果	
			Black paste	RL
<b>Phthalates 鄰苯二甲酸酯</b>				
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 (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	ppm		ND	50
Bis(2-Methoxyethyl) Phthalate (DMEP) 鄰苯二甲酸二(2-乙基甲醚)酯	ppm		ND	50
<b>Halogen Content 鹵素含量</b>				
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		108	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	RL
			Black paste	
<b>Others 其他</b>				
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

Remarks: ppm = Parts per million based on wet weight of tested sample = mg/kg  
備註 百萬分之一, 依據測試樣品溼重計算 = 毫克/公斤  
ND = Not detected 未檢測出  
RL = Reporting limit, quantitation limit of analyte in sample  
報告極限, 測試樣品之定量偵測極限



Test Conducted 測試內容 :

Responsibility of Chemist 分析人員 : PelnY Hsiao/ Vita Fu

Date Sample Received 樣品收件日期 : Aug 03, 2017

Test Period 樣品測試期間 : Aug 03, 2017 to Aug 10, 2017

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 <sup>6+</sup> ) 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。

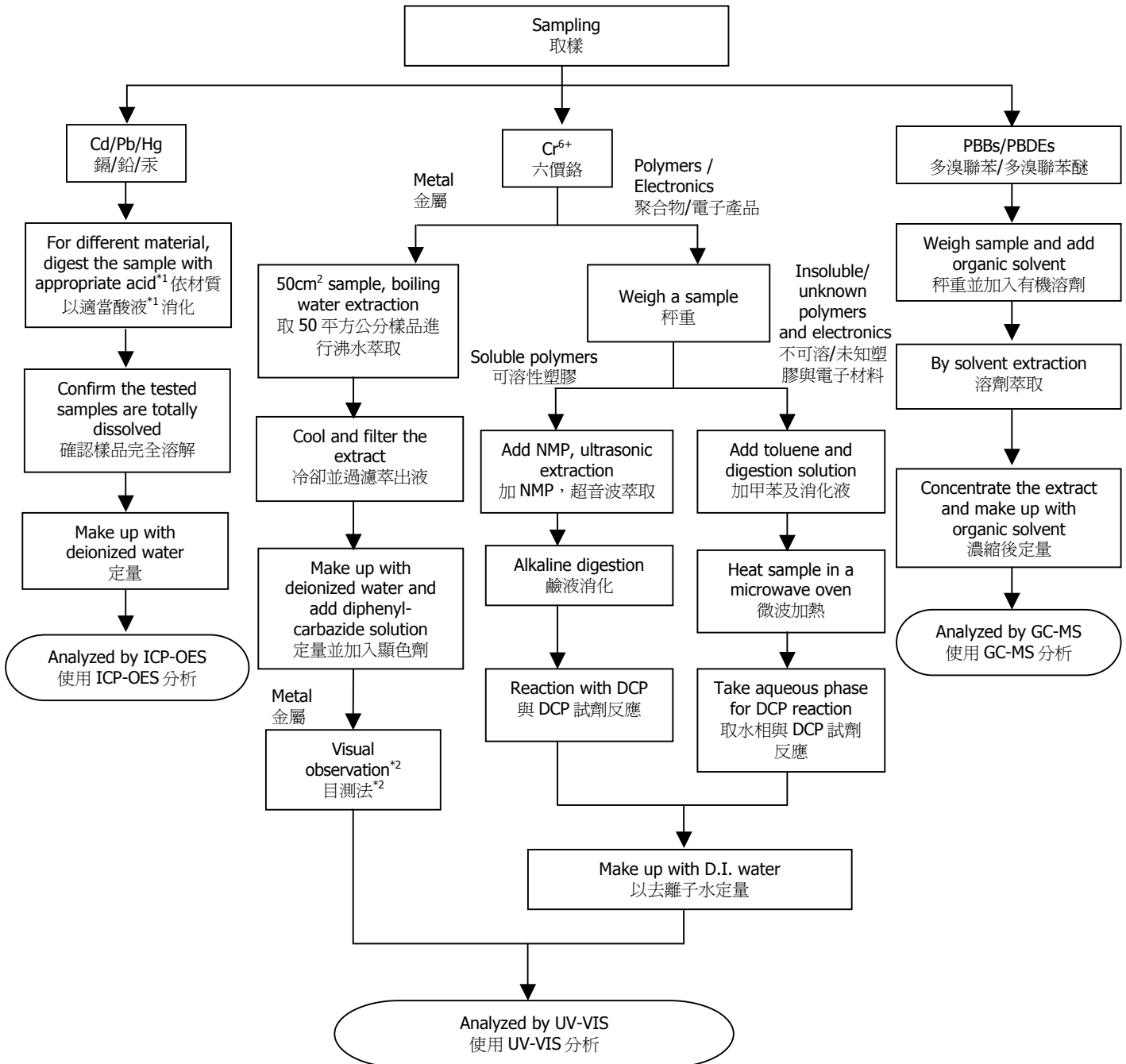


Test Conducted 測試內容 :

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 <sub>3</sub> ,HCl,HF,H <sub>2</sub> O <sub>2</sub> ,H <sub>3</sub> BO <sub>3</sub> 硝酸、鹽酸、氫氟酸、雙氧水、硼酸
Metals 金屬	HNO <sub>3</sub> ,HCl,HF 硝酸、鹽酸、氫氟酸
Electronics 電子產品	HNO <sub>3</sub> ,HCl,H <sub>2</sub> O <sub>2</sub> ,HBF <sub>4</sub> 硝酸、鹽酸、雙氧水、氟硼酸

\*2: If sample solution is significantly more intense than 0.13 µg/cm<sup>2</sup> 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/cm<sup>2</sup> 深，採用目測法判定六價鉻結果為陽性。



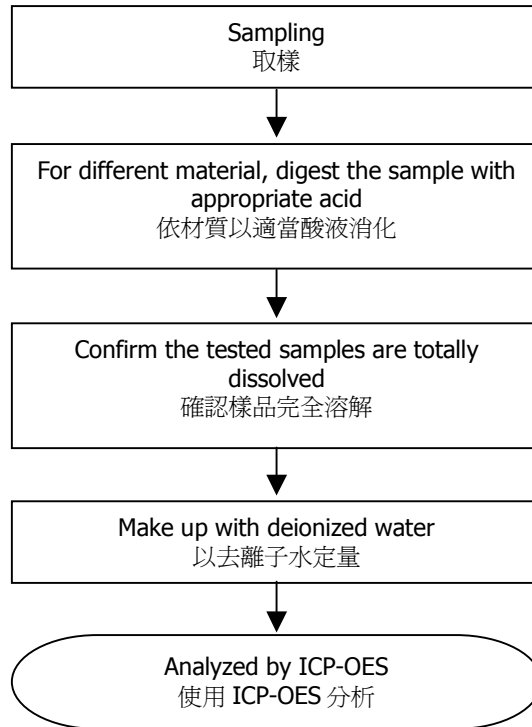


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Heavy Metal (Be,Sb) Content 重金屬(鉍,銻)

Reference Method 參考方法 : USEPA 3052

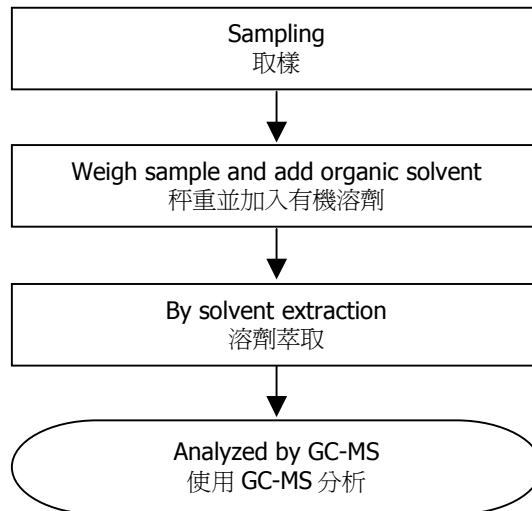


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Phthalates Content 鄰苯二甲酸酯測試

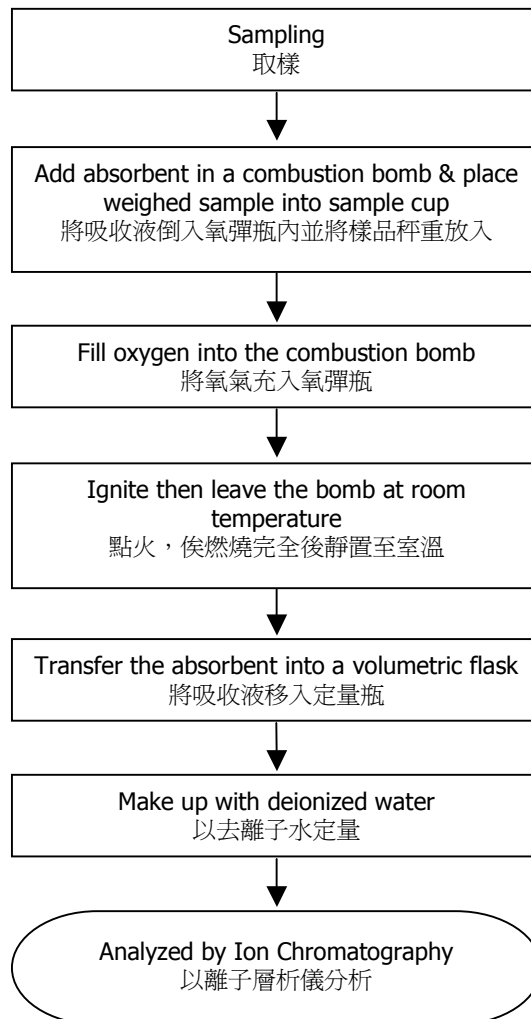
Reference Method 參考方法: IEC 62321-8:2017



Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

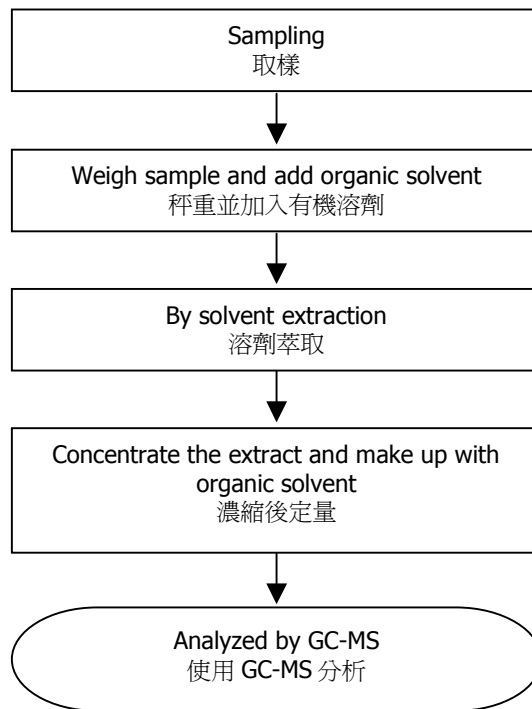
Test for Halogen Content 鹵素測試  
Reference Method 參考方法 : EN 14582



Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

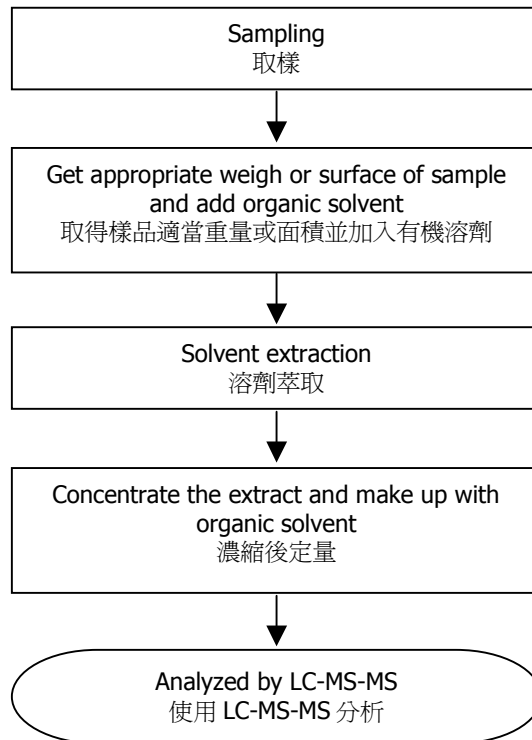
Test for Hexabromocyclododecane (HBCDD) 六溴環十二烷測試  
Reference Method 參考方法 : USEPA 3540C

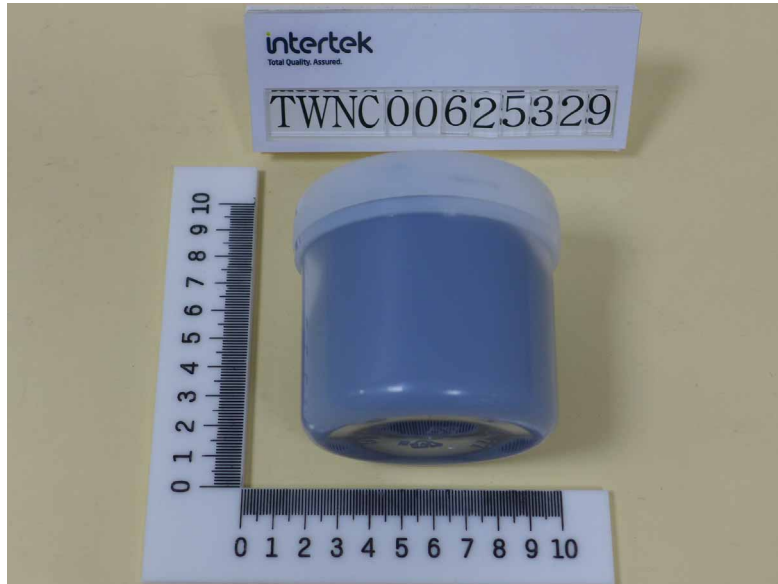


Test Conducted 測試內容 :

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





End of Report

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