

Test Report 測試報告

Applicant: LEATEC FINE CERAMICS CO., LTD.
申請廠商 九豪精密陶瓷股份有限公司
No. 160, Sec. 1, Pingdong Rd.,
Pingzhen Dist., Taoyuan City, Taiwan
桃園市平鎮區平東路一段 160 號

Number : TWNC01144722S1
報告號碼

Issue Date : Mar 03, 2023
報告發行日期

This is to supersede
Report No. TWNC01144722
Dated Jan 10, 2023
此份報告取代報告號碼 TWNC01144722
日期 2023 年 1 月 10 日

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 : AL2O3 SUBSTRATE (氧化鋁陶瓷基板)

樣品名稱

Style / Item No. : HE 系列(HE Series), HR 系列(HR Series), 乾壓系列產品(Press Series)

產品型號

CR7910, CR3080, CR1598, CR0874, CR0792, CR0038, CR0048, CR0058, CR0068, CR0075,
CR0108, CR0150, CR0208, CRM506, CRM312, CRM270, CRM264, CRM180, CA504A,
CA429B, CA1276, EM3008, EM3300, ES4515, EB3015, EB3315, 29998-4, 108640-4

Date Sample Received : Jan 04, 2023

收件日期

Date Test Started : Jan 04, 2023 / Feb 23, 2023

開始測試日期

Test Conducted 測試執行 :

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

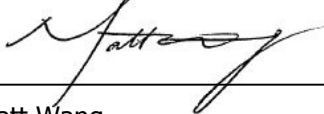
依申請商之要求, 細節請參考附頁.

Conclusion 結論:

Please see page two.

請見第二頁。

Authorized By:
On behalf of Intertek Testing Services
Taiwan Limited



Matt Wang
Director



Signed by:



Thomas Chou
Manager



Test Report 測試報告

Number : TWNC01144722S1
報告號碼

Conclusion 結論:

Tested Sample 測試樣品
Submitted Samples
送檢樣品

Standard 標準

Restriction of Hazardous Substances (RoHS)

危害物質限制

– As per applicant's request with reference to
2011/65/EU and amendment (EU) 2015/863
依據客戶要求參考歐盟指令 2011/65/EU 及其更新指令
(EU) 2015/863

Result 結果

Pass 合格

As per applicant's request 依據客戶要求

– Arsenic (As) Content
砷含量

See Test Conducted
請見測試內容

– Beryllium (Be) Content
鈹含量

See Test Conducted
請見測試內容

– Antimony (Sb) Content
銻含量

See Test Conducted
請見測試內容

– Halogen Content
鹵素含量

See Test Conducted
請見測試內容

– Polyvinyl Chloride (PVC)
聚氯乙烯

See Test Conducted
請見測試內容

– Bisphenol-A Content
雙酚-A 含量

See Test Conducted
請見測試內容

– Hexabromocyclododecane (HBCDD) Content
六溴環十二烷含量

See Test Conducted
請見測試內容

– Perfluorooctane Sulfonates (PFOS) Content
全氟辛磺酸含量

See Test Conducted
請見測試內容

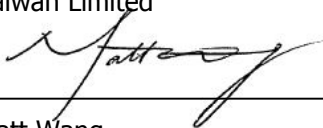
– Perfluorooctanoic Acid (PFOA) Content
全氟辛酸含量

See Test Conducted
請見測試內容

– Polychlorinated Biphenyls (PCBs) Content
多氯聯苯含量

See Test Conducted
請見測試內容

Authorized By:
On behalf of Intertek Testing Services
Taiwan Limited



Matt Wang
Director



Signed by:



Thomas Chou
Manager



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 |
|-------------------------------|------------|---|----------------|-----|
| | | | White material | |
| 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 | MDL |
|---|------------|--|----------------|-----|
| | | | White material | |
| 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 |
|--|------------|--|----------------|-----|
| | | | White material | |
| 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 (DNPP) 鄰苯二甲酸二戊酯 | 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 | MDL |
|--|------------|---|----------------|------|
| | | | White material | |
| 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 |
| Others 其他 | | | | |
| 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 |
| Bisphenol-A 雙酚-A | ppm | By solvent extraction and determined by LC-MS-MS. 以溶劑萃取並用液相層析串聯質譜儀分析。 | ND | 0.1 |
| 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 |
|---|------------|--|----------------|-----|
| | | | White material | |
| Others 其他 | | | | |
| Polychlorinated Biphenyls (PCBs) 多氯聯苯 | ppm | With reference to USEPA 3540C, by solvent extraction and determined by GC-ECD or GC-ECNI-MS. 參考 USEPA 3540C, 以溶劑萃取並用氣相層析電子捕獲偵測儀或氣相層析-化學游離質譜儀分析。 | ND | 1 |

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

Responsibility of Chemist 分析人員 : Beef Hsu / Vita Fu

Date Sample Received 樣品收件日期 : Jan 04, 2023

Test Period 樣品測試期間 : Jan 04, 2023 to Jan 10, 2023 / Feb 23, 2023 to Mar 03, 2023

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。

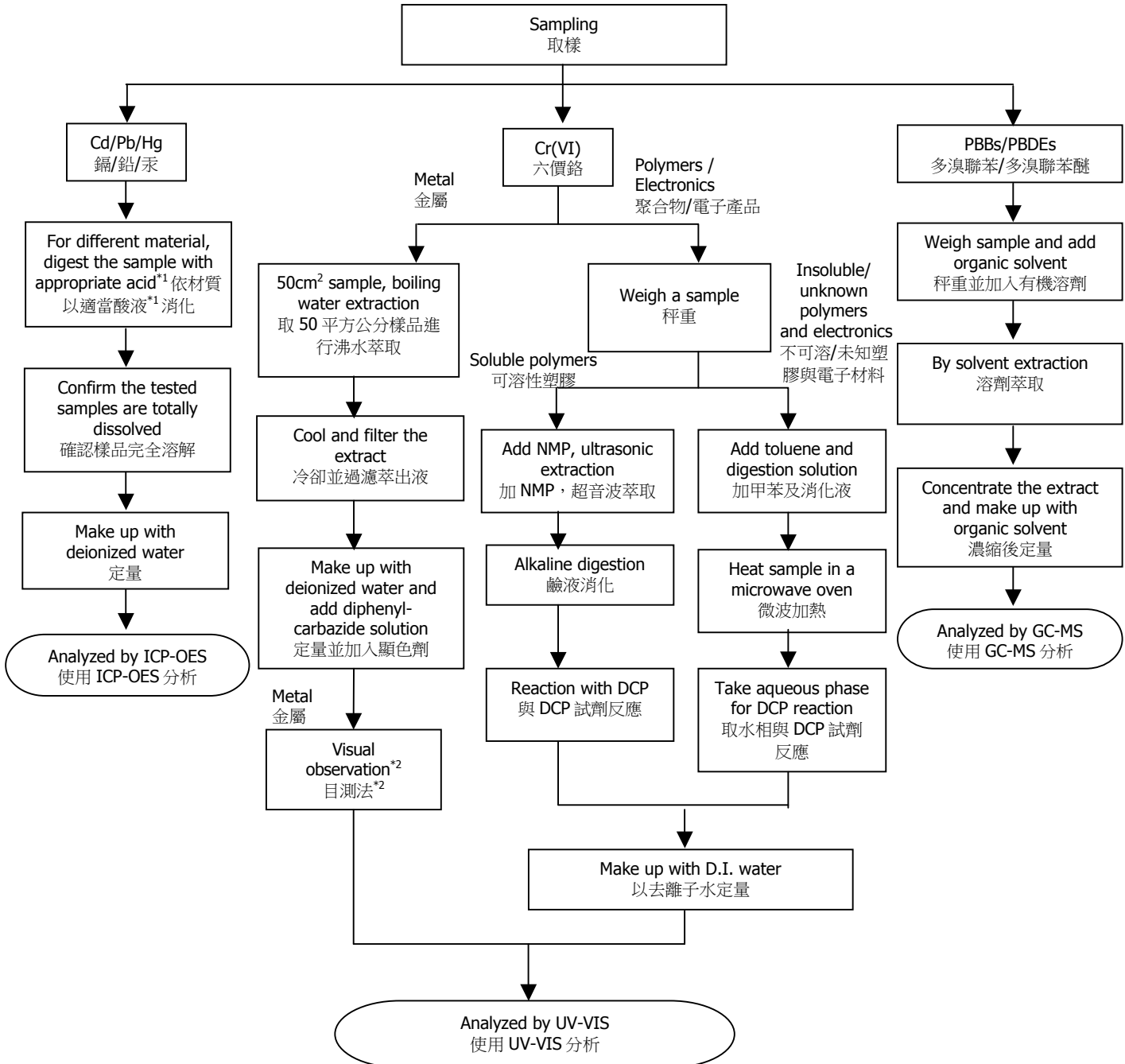


Test Conducted 測試內容 :

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。

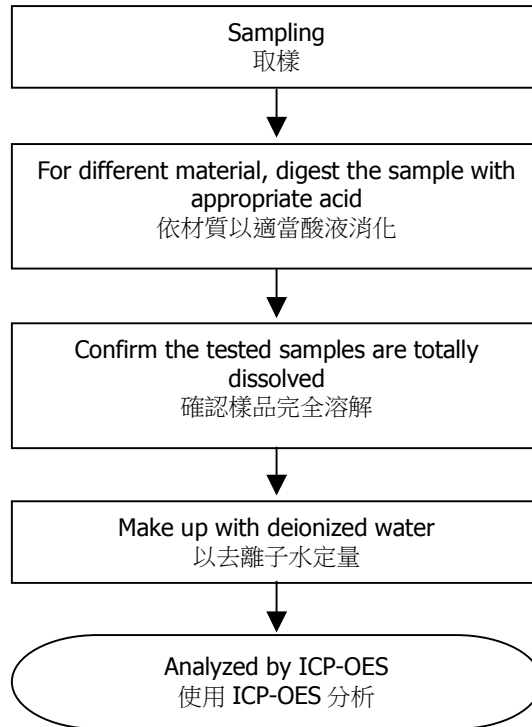


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

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

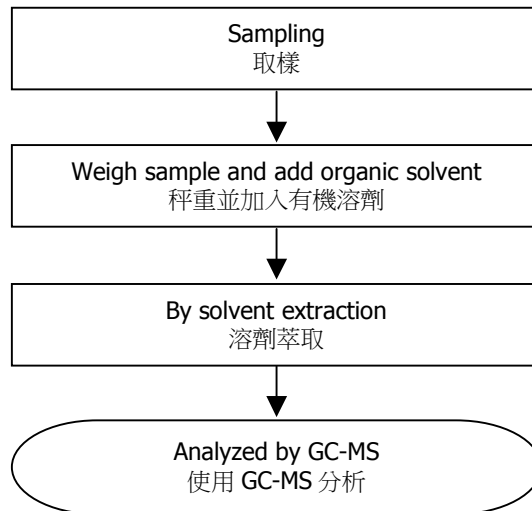
Reference Method 參考方法 : USEPA 3052



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

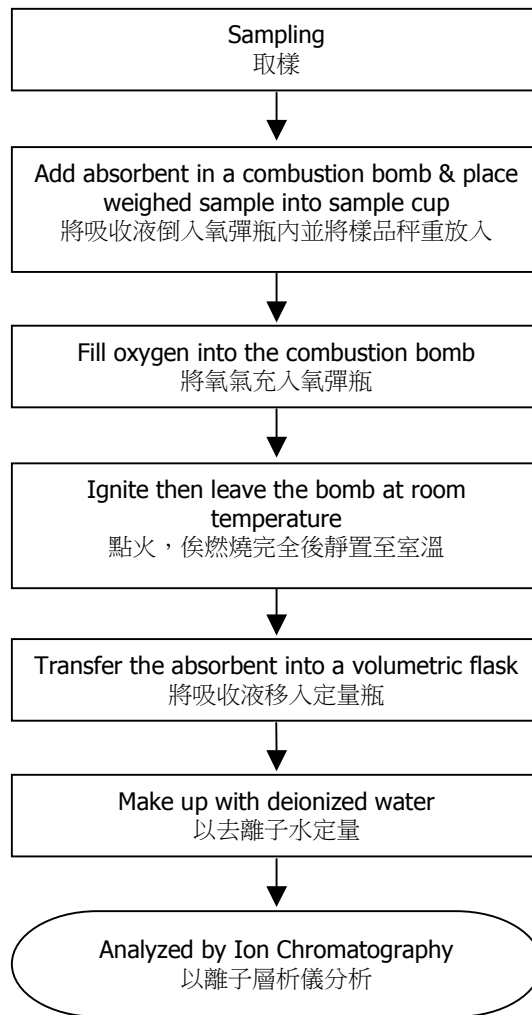


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Halogen Content 鹵素測試

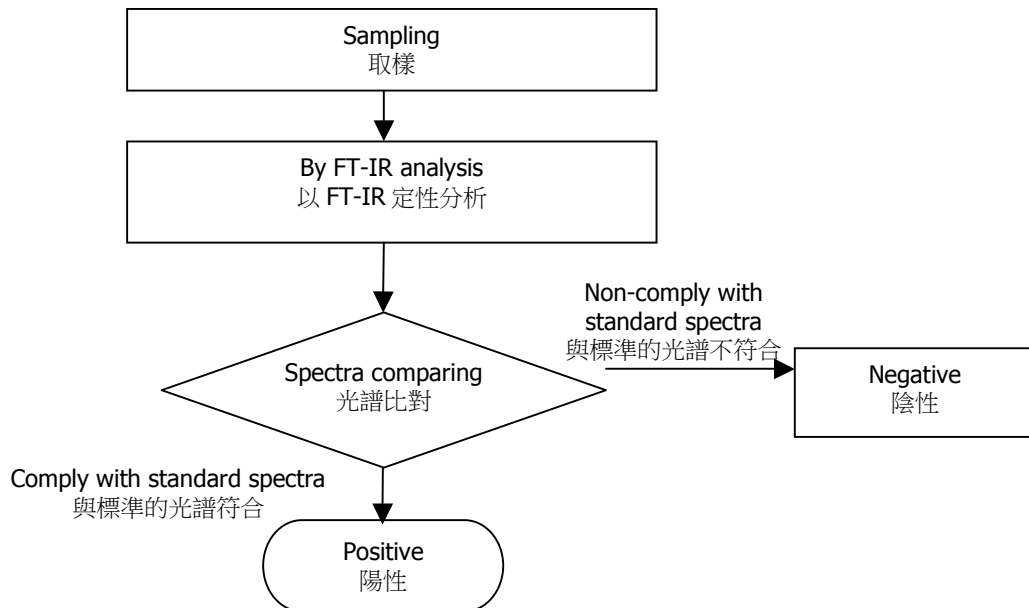
Reference Method 參考方法 : EN 14582:2016



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 : FT-IR Analysis

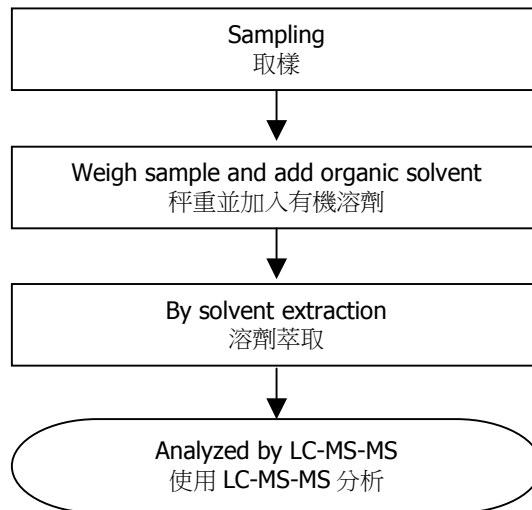


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

Test for Bisphenol-A Content 雙酚-A 測試

Reference Method 參考方法 : Solvent extraction 溶劑萃取

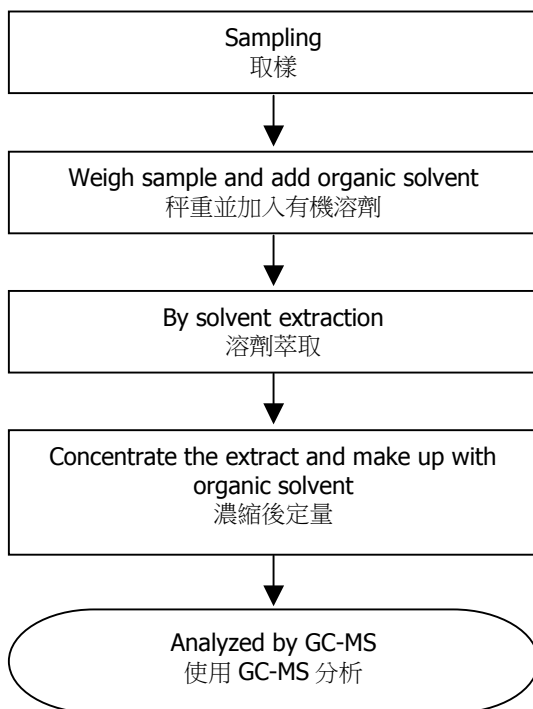


Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

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

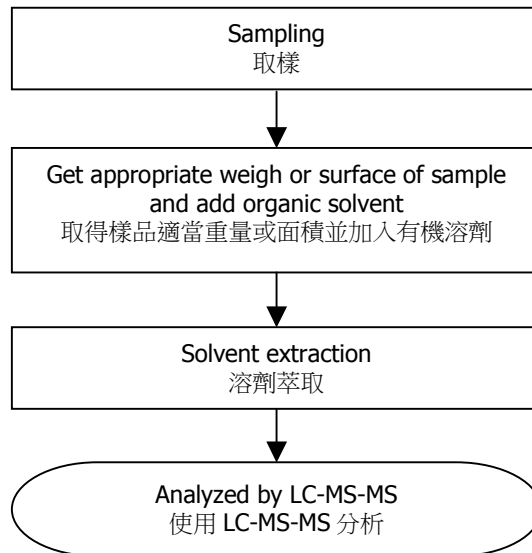
Reference Method 參考方法 : USEPA 3540C



Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

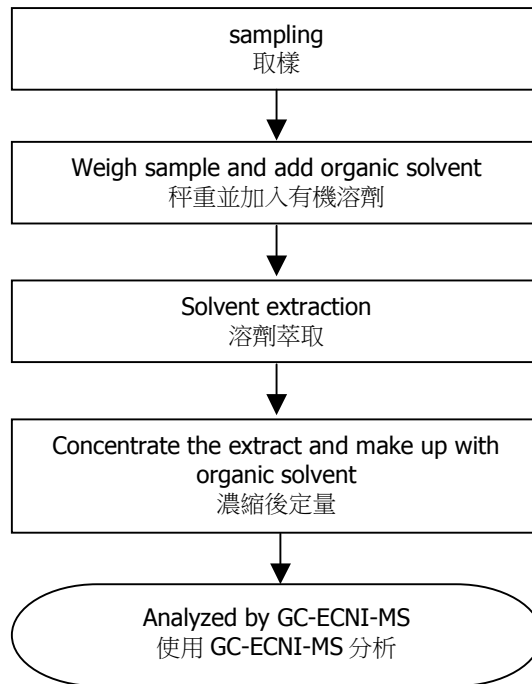
Test for Perfluorooctane Sulfonates (PFOS) / Perfluorooctanoic Acid (PFOA) Content 全氟辛磺酸 / 全氟辛酸測試
Reference Method 參考方法 : CEN/TS 15968:2010



Test Conducted 測試內容 :

Measurement Flowchart 測試流程圖:

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



Sample photo 樣品照片 :



Revision Notes 修改註記:

1. Intertek Testing Services report number TWNC01144722, issue date Jan 10, 2023, has been superseded by a revised Intertek Testing Services Report Number TWNC01144722S1. Intertek Testing Services 報告號碼 TWNC01144722, 發行日期 Jan 10, 2023, 已被 Intertek Testing Services 報告號碼 TWNC01144722S1 取代並註銷。
2. Revised Contents 修改內容
 - Page 1, added date test started. 頁碼 1, 新增開始測試日期。
 - Page 2, added conclusion of PCBs. 頁碼 2, 新增 PCBs 的結論。
 - Page 7, added test result of PCBs content. 頁碼 7, 新增 PCBs 含量結果。
 - Page 17, added measurement flowchart of PCBs. 頁碼 17, 新增 PCBs 的測試流程圖。

End of Report

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Reporting Statements of Conformity: Please note that the test results contain statement of conformity with the decision rules which are based on the specifications of customers, regulations and standards, and does not consider measurement uncertainty.

