

## 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. 26, Ln. 470, Sec. 2, Nanshan Rd.,  
Luzhu District, Taoyuan City 338,  
Taiwan  
桃園市蘆竹區南山路二段 470 巷 26 號

Number : TWNC01175646  
報告號碼

Issue Date : May 23, 2023  
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 Resistors Series (Totally Lead Free)

樣品名稱

Style / Item No. : RM01XXW Series/RM02XXW Series/RM04XXW Series/RM06XXW Series/RM10XXW Series/RM12XXW Series/RM13XXW Series/RM20XXW Series/RM25XXW Series

產品型號

Date Sample Received : May 12, 2023

收件日期

Date Test Started : May 12, 2023

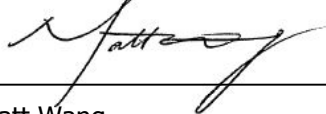
開始測試日期

### 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.

Authorized By:  
On behalf of Intertek Testing Services  
Taiwan Limited



Matt Wang  
Director



Signed by:



Thomas Chou  
Manager



Test Conducted 測試內容 :

**1. Chemical Test Result 化學測試結果**

| Test Item<br>測試項目             | Unit<br>單位 | Test Method<br>測試方法  | Result 結果                                   | MDL |
|-------------------------------|------------|--|---|-----|
|                               |            |  | Mixed all kinds of<br>submitted samples (#) |     |
| <b>Heavy Metal 重金屬</b>        |            |  |   |     |
| Cadmium (Cd) Content<br>鎘含量   | ppm        | With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES.<br>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<br>鉛含量      | ppm        | With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES.<br>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<br>汞含量   | ppm        | With reference to IEC 62321-4:2013+AMD1:2017, by microwave or acid digestion and determined by ICP-OES.<br>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<br>砷含量   | ppm        | With reference to USEPA 3052, by microwave digestion and determined by ICP-OES.<br>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<br>鈹含量 | ppm        | With reference to USEPA 3052, by microwave digestion and determined by ICP-OES.<br>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<br>銻含量  | ppm        | With reference to USEPA 3052, by microwave digestion and determined by ICP-OES.<br>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 :

1. **Chemical Test Result** 化學測試結果

| Test Item<br>測試項目                           | Unit<br>單位 | Test Method<br>測試方法  | Result 結果                                   | MDL |
|---|------------|--|---|-----|
|   |            |  | Mixed all kinds of<br>submitted samples (#) |     |
| <b>Heavy Metal 重金屬</b>                      |            |  |   |     |
| Chromium VI (Cr(VI)) Content<br>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.<br>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   |
| <b>Polybrominated Biphenyls (PBBs) 多溴聯苯</b> |            |  |   |     |
| Monobrominated Biphenyls<br>(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.<br>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<br>(DiBB) 二溴聯苯       | ppm        |  | ND  | 5   |
| Tribrominated Biphenyls<br>(TriBB) 三溴聯苯     | ppm        |  | ND  | 5   |
| Tetrabrominated Biphenyls<br>(TetraBB) 四溴聯苯 | ppm        |  | ND  | 5   |
| Pentabrominated Biphenyls<br>(PentaBB) 五溴聯苯 | ppm        |  | ND  | 5   |
| Hexabrominated Biphenyls<br>(HexaBB) 六溴聯苯   | ppm        |  | ND  | 5   |
| Heptabrominated Biphenyls<br>(HeptaBB) 七溴聯苯 | ppm        |  | ND  | 5   |
| Octabrominated Biphenyls<br>(OctaBB) 八溴聯苯   | ppm        |  | ND  | 5   |
| Nonabrominated Biphenyls<br>(NonaBB) 九溴聯苯   | ppm        |  | ND  | 5   |
| Decabrominated Biphenyl<br>(DecaBB) 十溴聯苯    | ppm        |  | ND  | 5   |



Test Conducted 測試內容 :

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| Test Item<br>測試項目  | Unit<br>單位 | Test Method<br>測試方法  | Result 結果                                   |     |
|--|------------|--|---|-----|
|  |            |  | Mixed all kinds of<br>submitted samples (#) | MDL |
| <b>Polybrominated Diphenyl Ethers (PBDEs) 多溴聯苯醚</b>        |            |  |   |     |
| Monobrominated Diphenyl Ethers<br>(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.<br>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<br>(DiBDE) 二溴聯苯醚              | ppm        |  | ND  | 5   |
| Tribrominated Diphenyl Ethers<br>(TriBDE) 三溴聯苯醚            | ppm        |  | ND  | 5   |
| Tetrabrominated Diphenyl Ethers<br>(TetraBDE) 四溴聯苯醚        | ppm        |  | ND  | 5   |
| Pentabrominated Diphenyl Ethers<br>(PentaBDE) 五溴聯苯醚        | ppm        |  | ND  | 5   |
| Hexabrominated Diphenyl Ethers<br>(HexaBDE) 六溴聯苯醚          | ppm        |  | ND  | 5   |
| Heptabrominated Diphenyl Ethers<br>(HeptaBDE) 七溴聯苯醚        | ppm        |  | ND  | 5   |
| Octabrominated Diphenyl Ethers<br>(OctaBDE) 八溴聯苯醚          | ppm        |  | ND  | 5   |
| Nonabrominated Diphenyl Ethers<br>(NonaBDE) 九溴聯苯醚          | ppm        |  | ND  | 5   |
| Decabrominated Diphenyl Ether<br>(DecaBDE) 十溴聯苯醚           | ppm        |  | ND  | 5   |
| <b>Phthalates 鄰苯二甲酸酯</b>                                   |            |  |   |     |
| Di(2-ethylhexyl) Phthalate (DEHP)<br>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.<br>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<br>(DBP) 鄰苯二甲酸二丁酯                        | ppm        |  | ND  | 50  |
| Benzyl Butyl Phthalate<br>(BBP) 鄰苯二甲酸苯基丁酯                  | ppm        |  | ND  | 50  |
| Di-(Iso-Nonyl) Phthalate<br>(DINP) 鄰苯二甲酸二異壬酯               | ppm        |  | ND  | 50  |
| Di-(Iso-Decyl) Phthalate<br>(DIDP) 鄰苯二甲酸二異癸酯               | ppm        |  | ND  | 50  |
| Di-(N-Octyl) Phthalate<br>(DNOP) 鄰苯二甲酸二辛酯                  | ppm        |  | ND  | 50  |
| Diisobutyl Phthalate<br>(DIBP) 鄰苯二甲酸二異丁酯                   | ppm        |  | ND  | 50  |
| Di-n-pentyl phthalate (DPP, DnPP)<br>鄰苯二甲酸二戊酯              | ppm        |  | ND  | 50  |
| Di-n-hexyl phthalate (DnHP)<br>鄰苯二甲酸二正己酯(二己酯)              | ppm        |  | ND  | 50  |
| Bis(2-Methoxyethyl) phthalate<br>(DMEP)<br>鄰苯二甲酸二(2-乙基甲醚)酯 | ppm        |  | ND  | 50  |



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| Test Item<br>測試項目                                       | Unit<br>單位 | Test Method<br>測試方法   | Result 結果                                   |     |
|---|------------|---|---|-----|
|   |            |   | Mixed all kinds of<br>submitted samples (#) | MDL |
| <b>Polycyclic Aromatic Hydrocarbons (PAHs) 多環芳香族化合物</b> |            |   |   |     |
| Naphthalene 萘   | ppm        | With reference to AfPS GS 2019:01 PAK, by solvent extraction and determined by GC-MS.<br>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 蒾  | 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 茛并[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 |
| <b>Sum of PAHs marked with (Δ)</b><br>標示(Δ)之化合物總和       | ppm        |   | ND  | --  |
| <b>Sum of 15 PAHs 15 支 PAHs 總和</b>                      | ppm        |   | ND  | --  |
| <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.<br>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 :

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

## 1. Chemical Test Result 化學測試結果

| Test Item<br>測試項目                | Unit<br>單位 | Test Method<br>測試方法   | Result 結果 | MDL |
|----------------------------------|------------|---|-----------|-----|
|                                  |            |   | RM25XXW   |     |
| Polyvinyl Chloride (PVC)<br>聚氯乙烯 | NA         | By Beilstein's test (Flame Test) and FT-IR analysis.<br>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 : Cloud Hsu / Vita Fu

Date Sample Received 樣品收件日期 : May 12, 2023

Test Period 樣品測試期間 : May 12, 2023 to May 19, 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 :

**1. Chemical Test Result 化學測試結果**

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<br>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<br>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<br>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<br>供 14 歲以下兒童使用的產品(2A)  | Other consumer products<br>其它產品 (2B) | Use by children under 14 years old(3A)<br>供 14 歲以下兒童使用的產品(3A)  | Other consumer products<br>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<br>苯并[a]蒽            | < 0.2   | < 0.2  | < 0.5                                | < 0.5  | < 1                                  |
| Benzo[b]fluoranthene<br>苯并[b]芘          | < 0.2   | < 0.2  | < 0.5                                | < 0.5  | < 1                                  |
| Benzo[k]fluoranthene<br>苯并[k]芘          | < 0.2   | < 0.2  | < 0.5                                | < 0.5  | < 1                                  |
| Benzo[j]fluoranthene<br>苯并[j]芘          | < 0.2   | < 0.2  | < 0.5                                | < 0.5  | < 1                                  |
| Benzo[a]pyrene<br>苯并[a]芘                | < 0.2   | < 0.2  | < 0.5                                | < 0.5  | < 1                                  |
| Benzo[e]pyrene<br>苯并[e]芘                | < 0.2   | < 0.2  | < 0.5                                | < 0.5  | < 1                                  |
| Indeno[1,2,3-cd]pyrene<br>芘并[1,2,3-cd]芘 | < 0.2   | < 0.2  | < 0.5                                | < 0.5  | < 1                                  |
| Dibenzo[a,h]anthracene<br>二苯并[a,h]芘     | < 0.2   | < 0.2  | < 0.5                                | < 0.5  | < 1                                  |
| Benzo[g,h,i]perylene<br>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



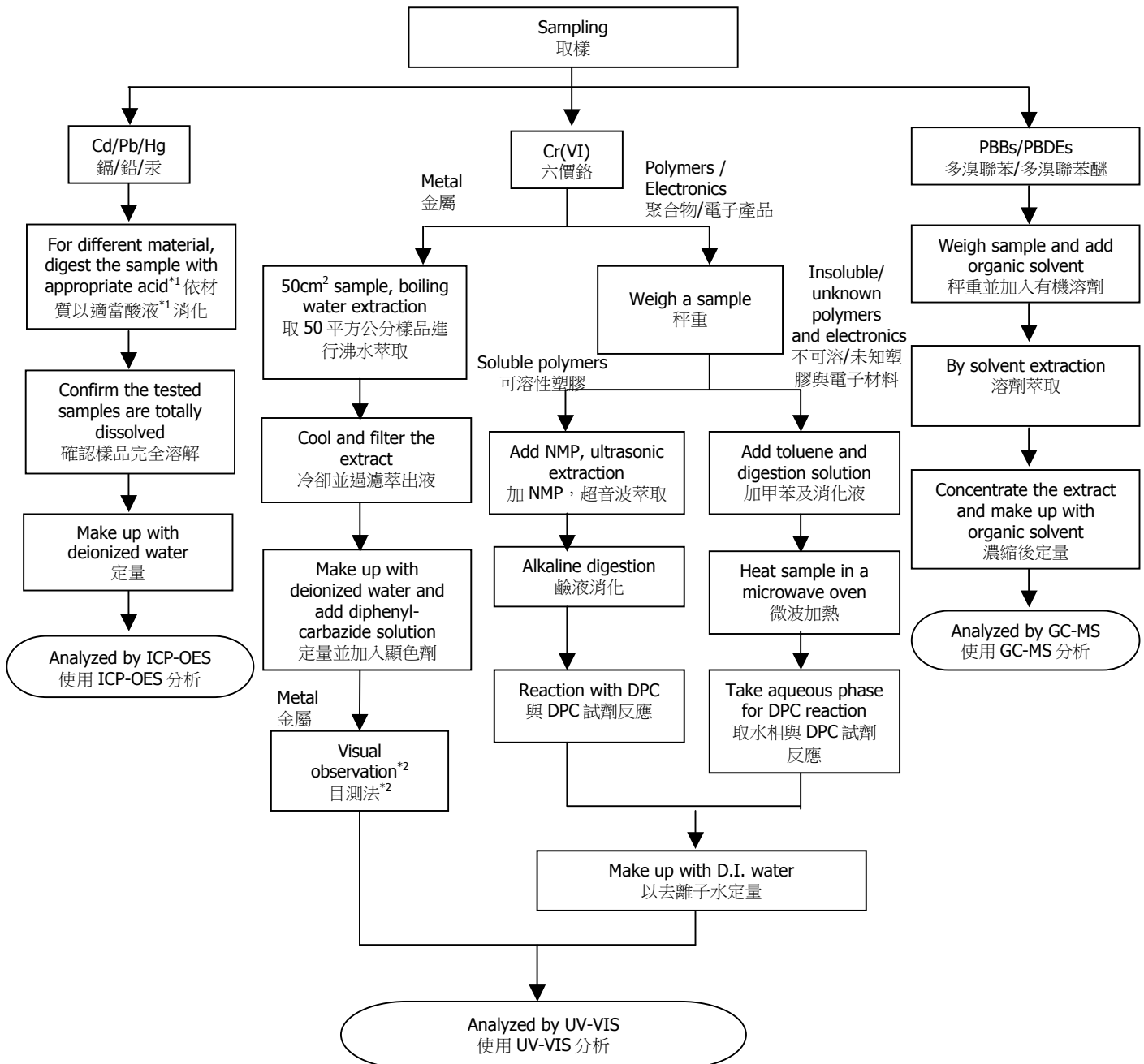


Test Conducted 測試內容 :

## 1. Chemical Test Result 化學測試結果

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 :

## 1. Chemical Test Result 化學測試結果

Remark 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。



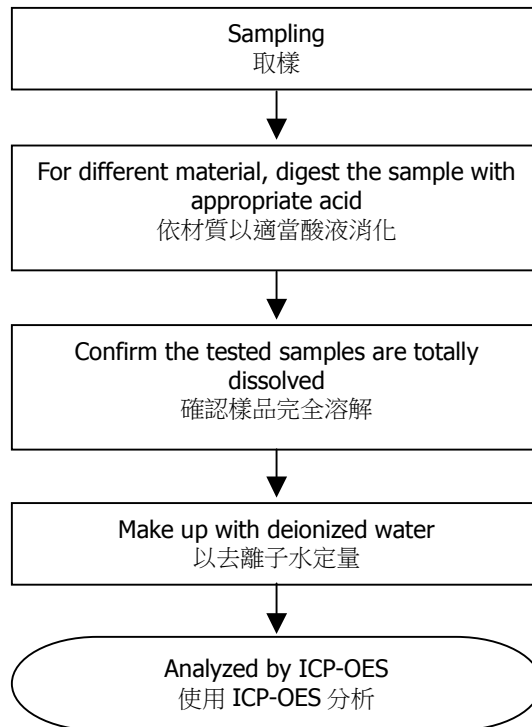
Test Conducted 測試內容 :

## 1. Chemical Test Result 化學測試結果

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



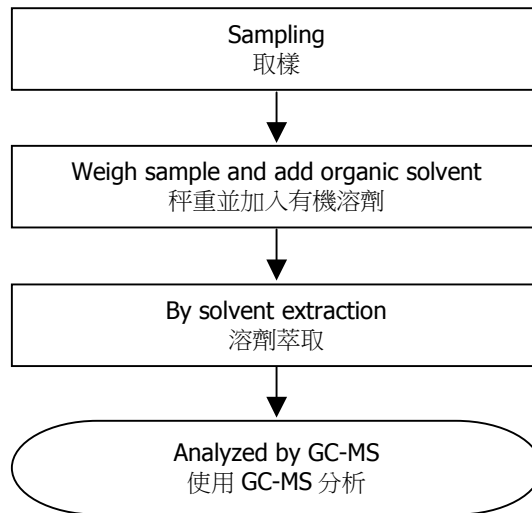
Test Conducted 測試內容 :

## 1. Chemical Test Result 化學測試結果

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

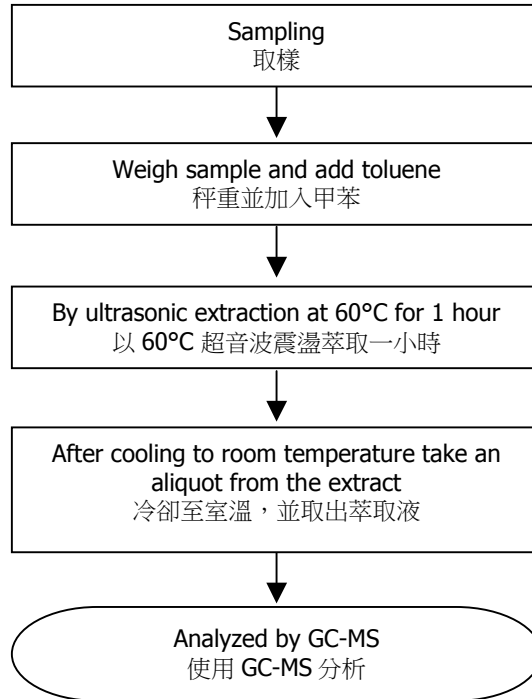


Test Conducted 測試內容 :

## 1. Chemical Test Result 化學測試結果

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



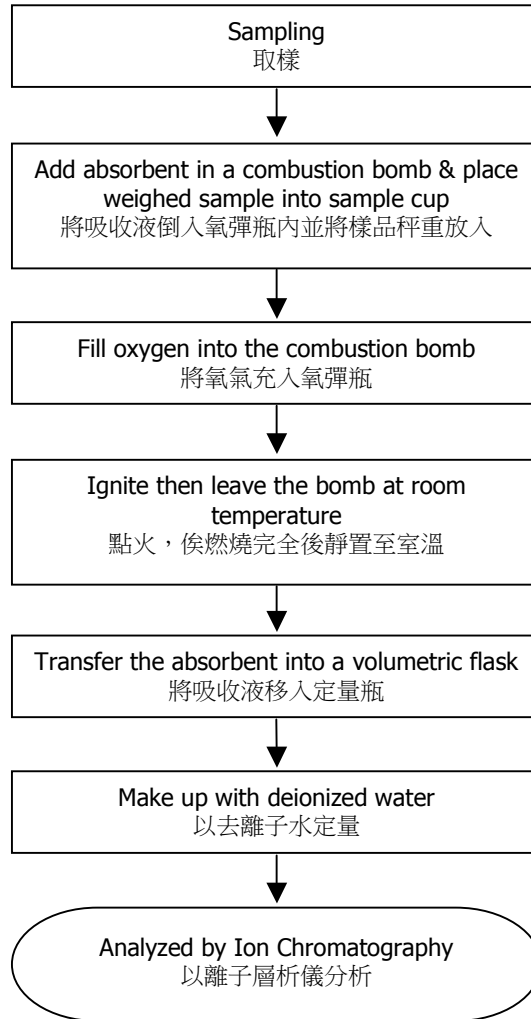
Test Conducted 測試內容 :

## 1. Chemical Test Result 化學測試結果

Measurement Flowchart 測試流程圖:

Test for Halogen Content 鹵素測試

Reference Method 參考方法 : EN 14582:2016

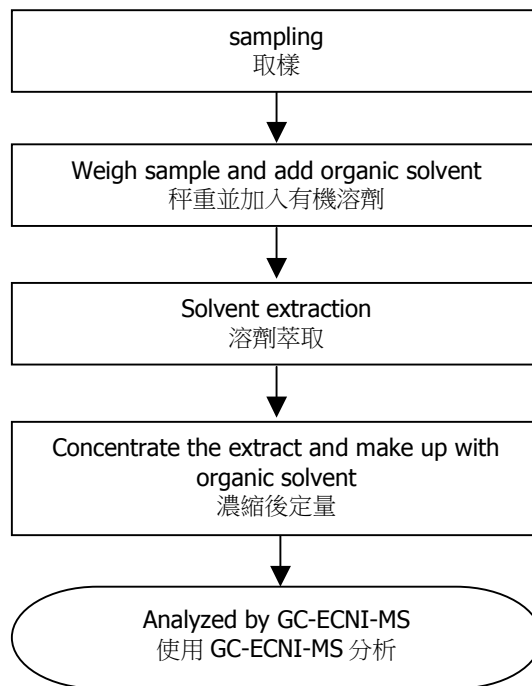


Test Conducted 測試內容 :

## 1. Chemical Test Result 化學測試結果

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



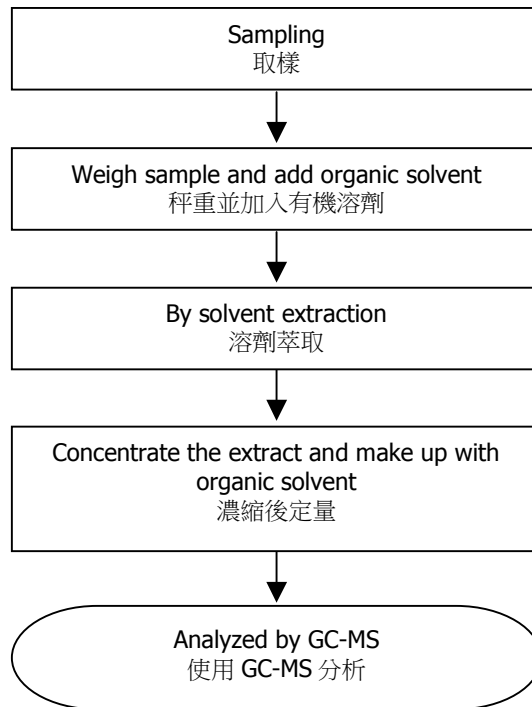
Test Conducted 測試內容 :

## 1. Chemical Test Result 化學測試結果

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



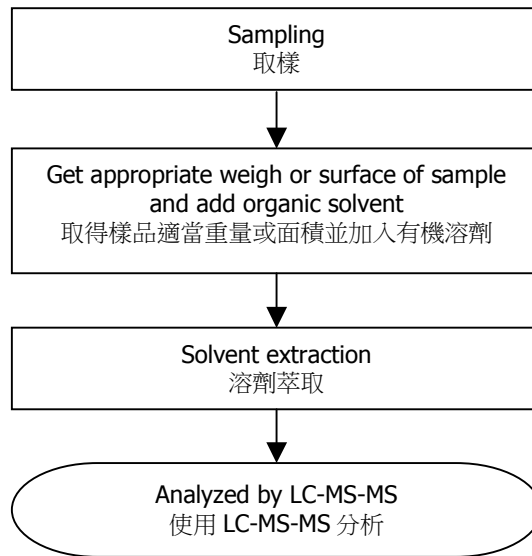


Test Conducted 測試內容 :

## 1. Chemical Test Result 化學測試結果

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



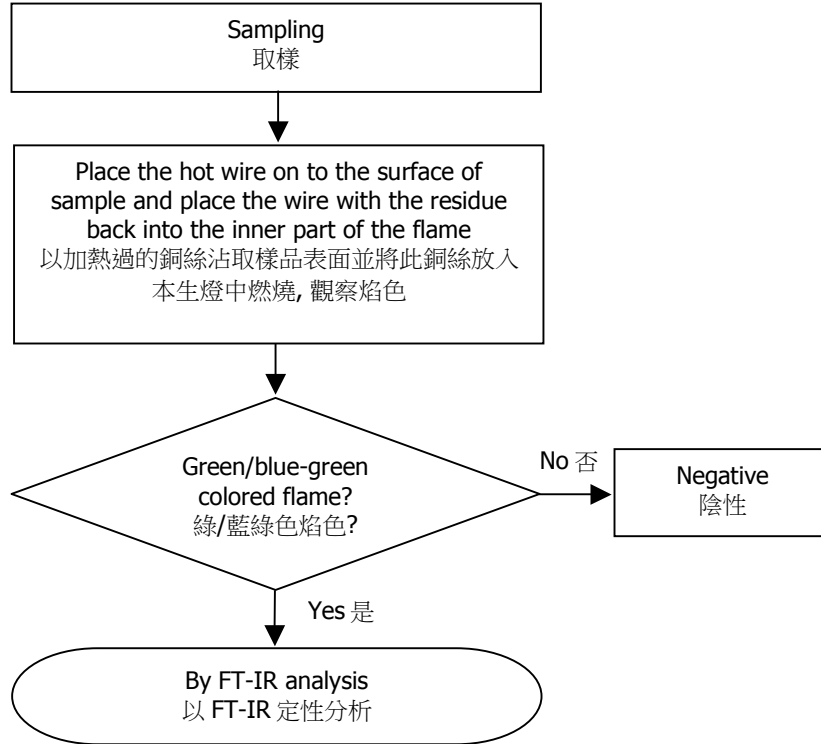
Test Conducted 測試內容 :

## 1. Chemical Test Result 化學測試結果

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



Test Conducted 測試內容 :

**2. Per- and Polyfluoroalkyl Substances (PFAS) 全氟烷基物質**

By Gas Chromatographic-Mass Spectrometric (GC-MS) and Liquid Chromatography/tandem Mass Spectrometry (LC-MS-MS) analysis.

參考 CEN/TS 15968:2010，以溶劑萃取並用氣相層析質譜儀(GC-MS)及液相層析串聯質譜儀(LC-MS-MS)分析。

| No. | Compound 化合物   | CAS No.    | Result 結果(ppm)                           |           |
|-----|--|------------|--|-----------|
|     |  |            | Mixed all kinds of submitted samples (#) | MDL (ppm) |
| 1.  | Perfluorobutanoic acid (PFBA)<br>全氟丁酸  | 375-22-4   | ND                                       | 0.01      |
| 2.  | Perfluorobutanesulfonic acid (PFBS)<br>全氟丁磺酸   | 375-73-5   | ND                                       | 0.01      |
| 3.  | Potassium perfluorobutane sulfonate (PFBS-K)<br>全氟丁基磺酸鉀<br>(Calculated by PFBS Content 以 PFBS 含量換算)  | 29420-49-3 | ND                                       | --        |
| 4.  | Sodium perfluorobutane sulfonate (PFBS-Na)<br>全氟丁基磺酸鈉<br>(Calculated by PFBS Content 以 PFBS 含量換算)  | 60453-92-1 | ND                                       | --        |
| 5.  | Perfluorobutanesulfonyl fluoride (PFBS-F)<br>全氟丁基磺酰氟<br>(Calculated by PFBS Content 以 PFBS 含量換算)   | 375-72-4   | ND                                       | --        |
| 6.  | Tetraethylammonium perfluorobutanesulfonate (PFBS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> )<br>全氟丁基磺酸四乙基銨<br>(Calculated by PFBS Content 以 PFBS 含量換算) | 25628-08-4 | ND                                       | --        |
| 7.  | Perfluoropentanoic acid (PFPeA)<br>全氟戊酸  | 2706-90-3  | ND                                       | 0.01      |
| 8.  | Perfluorohexanoic acid (PFHxA)<br>全氟己酸   | 307-24-4   | ND                                       | 0.01      |
| 9.  | Ammonium perfluorohexanoate (PFHxA-NH <sub>4</sub> )<br>全氟己酸銨<br>(Calculated by PFHxA Content 以 PFHxA 含量換算)  | 21615-47-4 | ND                                       | --        |
| 10. | Sodium perfluorohexanoate (PFHxA-Na)<br>全氟己酸鈉<br>(Calculated by PFHxA Content 以 PFHxA 含量換算)  | 2923-26-4  | ND                                       | --        |
| 11. | Potassium Perfluorohexanoate (PFHxA-K)<br>全氟己酸鉀<br>(Calculated by PFHxA Content 以 PFHxA 含量換算)  | 3109-94-2  | ND                                       | --        |
| 12. | 1H,1H,2H,2H-Perfluorooctanol (6:2 FTOH)<br>1H,1H,2H,2H-全氟辛醇  | 647-42-7   | ND                                       | 0.1       |
| 13. | 1H,1H,2H,2H-Perfluorooctyl acrylate (6:2 FTA)<br>1H,1H,2H,2H-全氟辛基丙烯酸酯  | 17527-29-6 | ND                                       | 0.01      |
| 14. | 1H,1H,2H,2H-Perfluorooctyl methacrylate (6:2 FTMA)<br>1H,1H,2H,2H-全氟辛基甲基丙烯酸酯   | 2144-53-8  | ND                                       | 0.01      |



Test Conducted 測試內容 :

**2. Per- and Polyfluoroalkyl Substances (PFAS) 全氟烷基物質**

| No. | Compound 化合物   | CAS No.     | Result 結果(ppm)                           |           |
|-----|--|-------------|--|-----------|
|     |  |             | Mixed all kinds of submitted samples (#) | MDL (ppm) |
| 15. | 1H,1H,2H,2H-Perfluorooctanesulphonic acid (6:2 FTS)<br>1H, 1H, 2H, 2H-全氟辛磺酸  | 27619-97-2  | ND                                       | 0.01      |
| 16. | Perfluorohexanesulfonic acid (PFHxS)<br>全氟己磺酸  | 355-46-4    | ND                                       | 0.01      |
| 17. | Perfluorohexane sulfonamide (PFHxSA)<br>全氟己磺醯胺   | 41997-13-1  | ND                                       | 0.01      |
| 18. | N-Methylperfluoro-1-hexanesulfonamide (N-Me-FHxSA)<br>N-甲基全氟己磺醯胺   | 68259-15-4  | ND                                       | 0.01      |
| 19. | 2-(N-Methylperfluoro-1-hexanesulfonamido)-ethanol<br>(N-Me-FHxSE) N-甲基全氟己磺乙醇胺  | 68555-75-9  | ND                                       | 0.01      |
| 20. | 2-(N-Ethylperfluoro-1-hexanesulfonamido)-ethanol (N-Et-FHxSE)<br>N-乙基全氟己磺乙醇胺   | 34455-03-3  | ND                                       | 0.01      |
| 21. | Sodium perfluorohexanesulfonate (PFHxS-Na)<br>全氟己基磺酸鈉<br>(Calculated by PFHxS Content 以 PFHxS 含量換算)                                      | 82382-12-5  | ND                                       | --        |
| 22. | Potassium perfluorohexanesulfonate (PFHxS-K)<br>全氟己基磺酸鉀<br>(Calculated by PFHxS Content 以 PFHxS 含量換算)                                    | 3871-99-6   | ND                                       | --        |
| 23. | Ammonium perfluorohexanesulfonate (PFHxS-NH <sub>4</sub> )<br>全氟己基磺酸銨<br>(Calculated by PFHxS Content 以 PFHxS 含量換算)                      | 68259-08-5  | ND                                       | --        |
| 24. | Lithium perfluorohexanesulfonate (PFHxS-Li)<br>全氟己基磺酸鋰<br>(Calculated by PFHxS Content 以 PFHxS 含量換算)                                     | 55120-77-9  | ND                                       | --        |
| 25. | Zinc perfluorohexanesulfonate (PFHxS-Zn)<br>全氟己基磺酸鋅<br>(Calculated by PFHxS Content 以 PFHxS 含量換算)  | 70136-72-0  | ND                                       | --        |
| 26. | Perfluorohexanesulphonyl fluoride (PFHxS-F)<br>全氟己基磺醯氟<br>(Calculated by PFHxS Content 以 PFHxS 含量換算)                                     | 423-50-7    | ND                                       | --        |
| 27. | N,N,N-tributylbutan-1-aminium tridecafluorohexane-1-sulfonate<br>N,N,N-三丁基丁-1-銨十三氟己烷-1-磺醯鹽<br>(Calculated by PFHxS Content 以 PFHxS 含量換算) | 108427-54-9 | ND                                       | --        |
| 28. | N,N,N-triethylethanaminium tridecafluorohexane-1-sulfonate<br>N,N,N-三乙基乙銨十三氟己烷-1-磺醯鹽<br>(Calculated by PFHxS Content 以 PFHxS 含量換算)       | 108427-55-0 | ND                                       | --        |
| 29. | Perfluoroheptanoic acid (PFHpA)<br>全氟庚酸  | 375-85-9    | ND                                       | 0.01      |



Test Conducted 測試內容 :

**2. Per- and Polyfluoroalkyl Substances (PFAS) 全氟烷基物質**

| No. | Compound 化合物   | CAS No.     | Result 結果(ppm)                           |           |
|-----|--|-------------|--|-----------|
|     |  |             | Mixed all kinds of submitted samples (#) | MDL (ppm) |
| 30. | 7H-Dodecafluoro heptane carboxylate (HPFHpA)<br>7H-十二氟庚烷羧酸   | 1546-95-8   | ND                                       | 0.01      |
| 31. | Perfluoroheptanesulfonic acid (PFHpS)<br>全氟庚磺酸   | 375-92-8    | ND                                       | 0.01      |
| 32. | Sodium perfluoroheptane sulfonate (PFHpS-Na)<br>全氟庚基磺酸鈉<br>(Calculated by PFHpS Content 以 PFHpS 含量換算)  | 21934-50-9  | ND                                       | --        |
| 33. | Perfluorooctanesulfonate (PFOS)<br>全氟辛磺酸   | 1763-23-1   | ND                                       | 0.01      |
| 34. | Potassium Perfluorooctane sulfonate (PFOS-K)<br>全氟辛基磺酸鉀<br>(Calculated by PFOS Content 以 PFOS 含量換算)  | 2795-39-3   | ND                                       | --        |
| 35. | Lithium perfluorooctane sulfonate (PFOS-Li)<br>全氟辛基磺酸鋰<br>(Calculated by PFOS Content 以 PFOS 含量換算)   | 29457-72-5  | ND                                       | --        |
| 36. | Ammonium perfluorooctane sulfonate (PFOS-NH <sub>4</sub> )<br>全氟辛基磺酸銨<br>(Calculated by PFOS Content 以 PFOS 含量換算)  | 29081-56-9  | ND                                       | --        |
| 37. | Diethanolamine perfluorooctane sulfonate (PFOS-NH(OH) <sub>2</sub> )<br>全氟辛基磺酸-二乙醇銨<br>(Calculated by PFOS Content 以 PFOS 含量換算)  | 70225-14-8  | ND                                       | --        |
| 38. | Tetraethylammonium perfluorooctanesulfonate (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> )<br>全氟辛基磺酸-四乙基銨<br>(Calculated by PFOS Content 以 PFOS 含量換算)                      | 56773-42-3  | ND                                       | --        |
| 39. | N-Decyl-N,N-dimethyl-1-decanaminium<br>1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (PFOS-DDA)<br>全氟辛基磺酸-二癸二甲基銨<br>(Calculated by PFOS Content 以 PFOS 含量換算) | 251099-16-8 | ND                                       | --        |
| 40. | Perfluorooctanesulfonyl fluoride (PFOS-F)<br>全氟辛基磺酰氟<br>(Calculated by PFOS Content 以 PFOS 含量換算)   | 307-35-7    | ND                                       | --        |
| 41. | Magnesium perfluorooctanesulfonate (PFOS-Mg)<br>全氟辛基磺酸鎂<br>(Calculated by PFOS Content 以 PFOS 含量換算)  | 91036-71-4  | ND                                       | --        |
| 42. | Sodium perfluorooctanesulfonate (PFOS-Na)<br>全氟辛基磺酸鈉<br>(Calculated by PFOS Content 以 PFOS 含量換算)   | 4021-47-0   | ND                                       | --        |



Test Conducted 測試內容 :

**2. Per- and Polyfluoroalkyl Substances (PFAS) 全氟烷基物質**

| No. | Compound 化合物  | CAS No.    | Result 結果(ppm)                           |           |
|-----|---|------------|--|-----------|
|     |   |            | Mixed all kinds of submitted samples (#) | MDL (ppm) |
| 43. | N-Ethylperfluorooctanesulfonamide (N-Et-FOSA)<br>N-乙基全氟辛磺醯胺                                 | 4151-50-2  | ND                                       | 0.01      |
| 44. | N-Methylperfluorooctanesulfonamide (N-Me-FOSA)<br>N-甲基全氟辛磺醯胺                                | 31506-32-8 | ND                                       | 0.01      |
| 45. | N-Ethylperfluorooctanesulfonamidoethanol (N-Et-FOSE)<br>N-乙基全氟辛磺醯乙醇胺                        | 1691-99-2  | ND                                       | 0.01      |
| 46. | N-Methylperfluorooctanesulfonamidoethanol (N-Me-FOSE)<br>N-甲基全氟辛磺醯乙醇胺                       | 24448-09-7 | ND                                       | 0.01      |
| 47. | Perfluorooctanesulfonamide (PFOSA)<br>全氟辛烷磺醯胺   | 754-91-6   | ND                                       | 0.01      |
| 48. | Perfluorooctanoate (PFOA)<br>全氟辛酸   | 335-67-1   | ND                                       | 0.01      |
| 49. | Sodium perfluorooctanoate (PFOA-Na)<br>全氟辛酸鈉<br>(Calculated by PFOA Content 以 PFOA 含量換算)    | 335-95-5   | ND                                       | --        |
| 50. | Potassium perfluorooctanoate (PFOA-K)<br>全氟辛酸鉀<br>(Calculated by PFOA Content 以 PFOA 含量換算)  | 2395-00-8  | ND                                       | --        |
| 51. | Silver perfluorooctanoate (PFOA-Ag)<br>全氟辛酸銀<br>(Calculated by PFOA Content 以 PFOA 含量換算)    | 335-93-3   | ND                                       | --        |
| 52. | Perfluorooctanoyl fluoride (PFOA-F)<br>全氟辛酸-氟化物<br>(Calculated by PFOA Content 以 PFOA 含量換算) | 335-66-0   | ND                                       | --        |
| 53. | Ammonium perfluorocaprylate (APFO)<br>全氟辛酸銨<br>(Calculated by PFOA Content 以 PFOA 含量換算)     | 3825-26-1  | ND                                       | --        |
| 54. | 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)<br>1H, 1H, 2H, 2H-全氟癸磺酸                  | 39108-34-4 | ND                                       | 0.01      |
| 55. | Methyl perfluorooctanoate (Me-PFOA)<br>全氟辛酸甲酯   | 376-27-2   | ND                                       | 0.01      |
| 56. | Ethyl perfluorooctanoate (Et-PFOA)<br>全氟辛酸乙酯  | 3108-24-5  | ND                                       | 0.01      |
| 57. | 1H,1H,2H,2H-Perfluorodecanol (8:2 FTOH)<br>1H,1H,2H,2H-全氟癸醇                                 | 678-39-7   | ND                                       | 0.1       |
| 58. | 1H,1H,2H,2H-Perfluorodecyl acrylate (8:2 FTA)<br>1H,1H,2H,2H-全氟癸基丙烯酸酯                       | 27905-45-9 | ND                                       | 0.01      |
| 59. | 1H,1H,2H,2H-Perfluorodecyl methacrylate (8:2 FTMA)<br>1H,1H,2H,2H-全氟癸基甲基丙烯酸酯                | 1996-88-9  | ND                                       | 0.01      |



Test Conducted 測試內容 :

**2. Per- and Polyfluoroalkyl Substances (PFAS) 全氟烷基物質**

| No. | Compound 化合物  | CAS No.     | Result 結果(ppm)                           | MDL (ppm) |
|-----|---|-------------|--|-----------|
|     |   |             | Mixed all kinds of submitted samples (#) |           |
| 60. | Perfluorooctyl iodide (PFOI)<br>全氟辛基碘   | 507-63-1    | ND                                       | 0.01      |
| 61. | Perfluorononanoic acid (PFNA)<br>全氟壬酸   | 375-95-1    | ND                                       | 0.01      |
| 62. | Sodium perfluorononanoate (PFNA-Na)<br>全氟壬酸鈉<br>(Calculated by PFNA Content 以 PFNA 含量換算)                              | 21049-39-8  | ND                                       | --        |
| 63. | Ammonium perfluorononanoate (APFN)<br>全氟壬酸銨<br>(Calculated by PFNA Content 以 PFNA 含量換算)                               | 4149-60-4   | ND                                       | --        |
| 64. | Perfluoro-3,7-dimethyloctanoic acid (PF-3,7-DMOA)<br>全氟-3-7-二甲基辛酸   | 172155-07-6 | ND                                       | 0.01      |
| 65. | Perfluorodecanoic acid (PFDA)<br>全氟癸酸   | 335-76-2    | ND                                       | 0.01      |
| 66. | Sodium perfluorodecanoate (PFDA-Na)<br>全氟癸酸鈉<br>(Calculated by PFDA Content 以 PFDA 含量換算)                              | 3830-45-3   | ND                                       | --        |
| 67. | Ammonium perfluorodecanoate (APFD)<br>全氟癸酸銨<br>(Calculated by PFDA Content 以 PFDA 含量換算)                               | 3108-42-7   | ND                                       | --        |
| 68. | Perfluoroundecanoic acid (PFUnDA)<br>全氟十一酸  | 2058-94-8   | ND                                       | 0.01      |
| 69. | Perfluorododecanoic acid (PFDoDA)<br>全氟十二酸  | 307-55-1    | ND                                       | 0.01      |
| 70. | Ammonium Perfluorododecanoate (APFDoDA)<br>全氟十二酸銨<br>(Calculated by PFDoDA Content 以 PFDoDA 含量換算)                     | 3793-74-6   | ND                                       | --        |
| 71. | Perfluorodecanesulfonic acid (PFDS)<br>全氟癸磺酸  | 335-77-3    | ND                                       | 0.01      |
| 72. | Sodium perfluorodecanesulfonate (PFDS-Na)<br>全氟癸基磺酸鈉<br>(Calculated by PFDS Content 以 PFDS 含量換算)                      | 2806-15-7   | ND                                       | --        |
| 73. | Potassium perfluorodecanesulfonate (PFDS-K)<br>全氟癸基磺酸鉀<br>(Calculated by PFDS Content 以 PFDS 含量換算)                    | 2806-16-8   | ND                                       | --        |
| 74. | Ammonium hencosafluoro decanesulfonate (PFDS-NH <sub>4</sub> )<br>全氟癸基磺酸銨<br>(Calculated by PFDS Content 以 PFDS 含量換算) | 67906-42-7  | ND                                       | --        |



Test Conducted 測試內容 :

**2. Per- and Polyfluoroalkyl Substances (PFAS) 全氟烷基物質**

| No. | Compound 化合物  | CAS No.                   | Result 結果(ppm)                           |           |
|-----|---|---------------------------|--|-----------|
|     |   |                           | Mixed all kinds of submitted samples (#) | MDL (ppm) |
| 75. | Perfluorotridecanoic acid (PFTriDA)<br>全氟十三酸                                      | 72629-94-8                | ND                                       | 0.01      |
| 76. | Perfluorotetradecanoic acid (PFTeDA)<br>全氟十四酸                                     | 376-06-7                  | ND                                       | 0.01      |
| 77. | 1H,1H,2H,2H-Perfluorododecyl acrylate (10:2 FTA)<br>1H,1H,2H,2H-全氟十二烷基丙烯酸酯        | 17741-60-5                | ND                                       | 0.01      |
| 78. | 1H,1H,2H,2H-Perfluorododecanol (10:2 FTOH)<br>1H,1H,2H,2H-全氟十二醇                   | 865-86-1                  | ND                                       | 0.1       |
| 79. | 1H,1H,2H,2H-Perfluorotetradecanol (12:2 FTOH)<br>1H,1H,2H,2H-全氟十四醇                | 39239-77-5                | ND                                       | 0.1       |
| 80. | 1H,1H,2H,2H-Perfluorododecyl iodide (10:2 FTI)<br>1H,1H,2H,2H-全氟碘代十二烷             | 2043-54-1                 | ND                                       | 0.01      |
| 81. | 1H,1H,2H,2H-Perfluorododecyl methacrylate (10:2 FTMA)<br>1H,1H,2H,2H-全氟十二烷基甲基丙烯酸酯 | 2144-54-9/<br>162953-69-7 | ND                                       | 0.01      |
| 82. | 1H,1H,2H,2H-Perfluorododecanesulphonic acid (10:2 FTS)<br>1H,1H,2H,2H-全氟十二烷磺酸     | 120226-60-0               | ND                                       | 0.01      |
| 83. | 1H,1H,2H,2H-Perfluorotetradecyl iodide (12:2 FTI)<br>1H,1H,2H,2H-全氟碘代十四烷          | 30046-31-2                | ND                                       | 0.01      |
| 84. | 2H,2H-Perfluorodecanoic acid (H2PFDA)<br>2H,2H-全氟癸酸                               | 27854-31-5                | ND                                       | 0.01      |
| 85. | 2H,2H,3H,3H-Perfluoroundecanoic acid (4HPFUaA)<br>2H,2H,3H,3H-全氟十一酸               | 34598-33-9                | ND                                       | 0.01      |
| 86. | 1H,1H,2H,2H-Perfluorohexanol (4:2 FTOH)<br>1H,1H,2H,2H-全氟-1-己醇                    | 2043-47-2                 | ND                                       | 0.1       |
| 87. | 1H,1H,2H,2H-Perfluorodecyl iodide (8:2 FTI)<br>1H,1H,2H,2H-全氟癸基碘                  | 2043-53-0                 | ND                                       | 0.01      |
| 88. | Perfluoro(2-methyl-3-oxahexanoic) acid (HFPO-DA)<br>全氟(2-甲基-3-氧雜己酸)               | 13252-13-6                | ND                                       | 0.01      |
| 89. | 1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)<br>1H,1H,2H,2H-全氟己磺酸           | 757124-72-4               | ND                                       | 0.01      |
| 90. | Perfluorooctane sulfonamidoacetic acid (FOSAA)<br>全氟辛基磺酸胺乙酸                       | 2806-24-8                 | ND                                       | 0.01      |
| 91. | N-methylperfluorooctane sulfonamidoacetic acid (N-MeFOSAA)<br>N-甲基全氟辛基磺酸胺乙酸       | 2355-31-9                 | ND                                       | 0.01      |
| 92. | N-ethylperfluorooctane sulfonamidoacetic acid (N-EtFOSAA)<br>N-乙基全氟辛基磺酸胺乙酸        | 2991-50-6                 | ND                                       | 0.01      |
| 93. | Perfluorononanesulfonic acid (PFNS)<br>全氟壬磺酸                                      | 68259-12-1                | ND                                       | 0.01      |





Test Conducted 測試內容 :

**2. Per- and Polyfluoroalkyl Substances (PFAS) 全氟烷基物質**

| No. | Compound 化合物   | CAS No.    | Result 結果(ppm)                           | MDL (ppm) |
|-----|--|------------|--|-----------|
|     |  |            | Mixed all kinds of submitted samples (#) |           |
| 94. | Perfluorononanesulfonic acid sodium salt (PFNS-Na)<br>全氟壬磺酸鈉<br>(Calculated by PFNS Content 以 PFNS 含量換算) | 98789-57-2 | ND                                       | --        |
| 95. | 1H,1H,2H,2H-Perfluorohexyl methacrylate (4:2 FTMA)<br>1H,1H,2H,2H-全氟己基甲基丙烯酸酯                             | 1799-84-4  | ND                                       | 0.01      |

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

# = 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。



Sample photo 樣品照片 :



End of Report

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