

**Test Report** 

號碼(No.): ETR23803628 日期(Date): 24-Aug-2023 頁數(Page): 1 of 15

利汎科技股份有限公司 (LeFram TECHNOLOGY CORP.)

新竹縣關西鎮大同里13鄰水坑40號 (NO. 40, SHUI-KEN, LIN 13, TATUNG LI, KUAN HIS, HSINCHU, TAIWAN R.O.C.)

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by the applicant as):

送樣廠商(Sample Submitted By) : 利汎科技股份有限公司 (LeFram TECHNOLOGY CORP.)

樣品名稱(Sample Name) : LEAD FRAME 樣品型號(Style/Item No.) : C194(A194)

收件日(Sample Receiving Date)

: 16-Aug-2023

測試期間(Testing Period)

: 16-Aug-2023 to 24-Aug-2023

測試需求(Test Requested) : (1) 依據客戶指定

依據客戶指定·參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試 鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP。 (As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs,

PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).)

(2) 其他測試項目請見下一頁。 (Please refer to next pages for the other item(s).)

請參閱下一頁 (Please refer to following pages.)

測試結果(Test Results) :

結 論(Conclusion) :

(1) 根據客戶所選擇的部位測試,其編、鉛、汞、六價鉻、多溴聯苯 。多溴聯苯醚, DBP, BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU)

2015/863之限值要求。 (Based on the performed tests on selected part of submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive

(EU) 2015/863 amending Annex II to Directive 2011/65/EU.)

Troy Chang / Department Malager Signed for and on behalf of Alwah SGS TAIWAN LTD. Chemical Laboratory - Taipei



PIN CODE: 5350A4B



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新竹縣關西鎮大同里13鄰水坑40號 (NO. 40, SHUI-KEN, LIN 13, TATUNG LI, KUAN HIS, HSINCHU, TAIWAN R.O.C.)

#### 測試部位敘述 (Test Part Description)

No.1 : 銅色金屬底材 (BASE MATERIAL OF COPPER COLORED METAL)

#### 測試結果 (Test Results)

測試項目	測試方法	單位	MDL	結果	限值
(Test Items)	(Method)	(Unit)		(Result)	(Limit)
				No.1	
鎘 (Cd) (Cadmium (Cd))	參考IEC 62321-5: 2013 · 以感應耦合電漿	mg/kg	2	n.d.	100
	發射光譜儀分析。(With reference to IEC				
	62321-5: 2013, analysis was performed				
	by ICP-OES.)				
鉛 (Pb) (Lead (Pb))	參考IEC 62321-5: 2013,以感應耦合電漿	mg/kg	2	8.06	1000
	發射光譜儀分析。(With reference to IEC				
	62321-5: 2013, analysis was performed				
	by ICP-OES.)				
汞 (Hg) (Mercury (Hg))	參考IEC 62321-4: 2013+ AMD1: 2017	mg/kg	2	n.d.	1000
	以感應耦合電漿發射光譜儀分析。(With				
	reference to IEC 62321-4: 2013+ AMD1:				
	2017, analysis was performed by ICP-				
	OES.)				
六價鉻 (Hexavalent Chromium) Cr(VI)	參考IEC 62321-7-1: 2015,以紫外光-可見	μg/cm²	0.1	n.d.	-
(#2)	光分光光度計分析。(With reference to				
	IEC 62321-7-1: 2015, analysis was				
\\(\parallel{\paralle	performed by UV-VIS.)				
一溴聯苯 (Monobromobiphenyl)		mg/kg	5	n.d.	-
二溴聯苯 (Dibromobiphenyl)		mg/kg	5	n.d.	-
三溴聯苯 (Tribromobiphenyl)		mg/kg	5	n.d.	-
四溴聯苯 (Tetrabromobiphenyl)	參考IEC 62321-6: 2015,以氣相層析儀/質	mg/kg	5	n.d.	-
五溴聯苯 (Pentabromobiphenyl)	譜儀分析。(With reference to IEC 62321-	mg/kg	5	n.d.	-
六溴聯苯 (Hexabromobiphenyl)	6: 2015, analysis was performed by GC/MS.)	mg/kg	5	n.d.	-
七溴聯苯 (Heptabromobiphenyl)		mg/kg	5	n.d.	-
八溴聯苯 (Octabromobiphenyl)		mg/kg	5	n.d.	-
九溴聯苯 (Nonabromobiphenyl)		mg/kg	5	n.d.	-
十溴聯苯 (Decabromobiphenyl)	-	mg/kg	5	n.d.	-
多溴聯苯總和 (Sum of PBBs)		mg/kg	-	n.d.	1000

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新竹縣關西鎮大同里13鄰水坑40號 (NO. 40, SHUI-KEN, LIN 13, TATUNG LI, KUAN HIS, HSINCHU, TAIWAN R.O.C.)

測試項目	測試方法	單位	MDL	結果	限值
(Test Items)	(Method)	(Unit)		(Result)	(Limit)
				No.1	
一溴聯苯醚 (Monobromodiphenyl ether)		mg/kg	5	n.d.	-
二溴聯苯醚 (Dibromodiphenyl ether)		mg/kg	5	n.d.	-
三溴聯苯醚 (Tribromodiphenyl ether)		mg/kg	5	n.d.	-
四溴聯苯醚 (Tetrabromodiphenyl ether)	   參考IEC 62321-6: 2015,以氣相層析儀/質	mg/kg	5	n.d.	-
五溴聯苯醚 (Pentabromodiphenyl ether)	iii 儀分析。(With reference to IEC 62321-	mg/kg	5	n.d.	-
六溴聯苯醚 (Hexabromodiphenyl ether)	6: 2015, analysis was performed by	mg/kg	5	n.d.	-
七溴聯苯醚 (Heptabromodiphenyl ether)	GC/MS.)	mg/kg	5	n.d.	-
八溴聯苯醚 (Octabromodiphenyl ether)	GC/1V13.)	mg/kg	5	n.d.	-
九溴聯苯醚 (Nonabromodiphenyl ether)		mg/kg	5	n.d.	-
十溴聯苯醚 (Decabromodiphenyl ether)		mg/kg	5	n.d.	-
多溴聯苯醚總和 (Sum of PBDEs)		mg/kg	1	n.d.	1000
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl benzyl		mg/kg	50	n.d.	1000
phthalate (BBP))					
鄰苯二甲酸二丁酯 (DBP) (Dibutyl		mg/kg	50	n.d.	1000
phthalate (DBP))					
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-		mg/kg	50	n.d.	1000
(2-ethylhexyl) phthalate (DEHP))					
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl	[	mg/kg	50	n.d.	1000
phthalate (DIBP))					
鄰苯二甲酸二異癸酯 (DIDP) (Diisodecyl	   參考IEC 62321-8: 2017,以氣相層析儀/質	mg/kg	50	n.d.	_
phthalate (DIDP)) (CAS No.: 26761-40-	iii 儀分析。(With reference to IEC 62321-				
0, 68515-49-1)	8: 2017, analysis was performed by				
鄰苯二甲酸二異壬酯 (DINP) (Diisononyl	GC/MS.)	mg/kg	50	n.d.	=
phthalate (DINP)) (CAS No.: 28553-12-	GC/1V13.)				
0, 68515-48-0)					
鄰苯二甲酸二正辛酯 (DNOP) (Di-n-octyl		mg/kg	50	n.d.	-
phthalate (DNOP)) (CAS No.: 117-84-0)					
鄰苯二甲酸二正己酯 (DNHP) (Di-n-hexyl		mg/kg	50	n.d.	-
phthalate (DNHP)) (CAS No.: 84-75-3)					
鄰苯二甲酸雙(2-甲氧基乙基)酯 (DMEP)		mg/kg	50	n.d.	-
(Bis(2-methoxyethyl) phthalate (DMEP))					
(CAS No.: 117-82-8)					



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新竹縣關西鎮大同里13鄰水坑40號 (NO. 40, SHUI-KEN, LIN 13, TATUNG LI, KUAN HIS, HSINCHU, TAIWAN R.O.C.)

測試項目	測試方法	單位	MDL	結果	限值
(Test Items)	(Method)	(Unit)		(Result)	(Limit)
				No.1	
鄰苯二甲酸二正戊酯 (DNPP) (Di-n-	參考IEC 62321-8: 2017 · 以氣相層析儀/質	mg/kg	50	n.d.	-
pentyl phthalate (DNPP)) (CAS No.:	譜儀分析。(With reference to IEC 62321-				
131-18-0)	8: 2017, analysis was performed by				
	GC/MS.)				
六溴環十二烷及所有主要被辨別出的異構	參考IEC 62321: 2008·以氣相層析儀/質譜	mg/kg	5	n.d.	-
物(HBCDD) (α- HBCDD, β- HBCDD, γ-	儀分析。(With reference to IEC 62321:				
HBCDD) (Hexabromocyclododecane	2008, analysis was performed by				
(HBCDD) and all major	GC/MS.)				
diastereoisomers identified ( $\alpha$ - HBCDD,					
β- HBCDD, γ- HBCDD)) (CAS No.:					
25637-99-4, 3194-55-6 (134237-51-7,					
134237-50-6, 134237-52-8))					
氟 (F) (Fluorine (F)) (CAS No.: 14762-94-		mg/kg	50	n.d.	-
8)					
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-	   参考BS EN 14582: 2016 · 以離子層析儀分	mg/kg	50	n.d.	-
15-1)	析。(With reference to BS EN 14582:				
溴 (Br) (Bromine (Br)) (CAS No.: 10097-	2016, analysis was performed by IC.)	mg/kg	50	n.d.	-
32-2)					
碘 (I) (Iodine (I)) (CAS No.: 14362-44-8)		mg/kg	50	n.d.	-
全氟辛烷磺酸及其鹽類 (PFOS and its	參考CEN/TS 15968: 2010 , 以液相層析串	mg/kg	0.01	n.d.	-
salts) (CAS No.: 1763-23-1 and its salts)	聯質譜儀分析。(With reference to				
全氟辛酸及其鹽類 (PFOA and its salts)	CEN/TS 15968: 2010, analysis was	mg/kg	0.01	n.d.	-
(CAS No.: 335-67-1 and its salts)	performed by LC/MS/MS.)				
銻 (Sb) (Antimony (Sb)) (CAS No.: 7440-	參考US EPA 3050B: 1996 · 以感應耦合電	mg/kg	2	n.d.	-
36-0)	漿發射光譜儀分析。(With reference to				
	US EPA 3050B: 1996, analysis was				
	performed by ICP-OES.)				
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-	參考US EPA 3052: 1996 · 以感應耦合電漿	mg/kg	2	n.d.	-
41-7)	發射光譜儀分析。(With reference to US				
	EPA 3052: 1996, analysis was performed				
	by ICP-OES.)				



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新竹縣關西鎮大同里13鄰水坑40號 (NO. 40, SHUI-KEN, LIN 13, TATUNG LI, KUAN HIS, HSINCHU, TAIWAN R.O.C.)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result) No.1	限值 (Limit)
紅磷 (Red Phosphorus)	以熱裂解-氣相層析儀/質譜儀分析。 (Analysis was performed by Pyrolyzer- GC/MS.)	**	-	Negative	-

#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 0.1% = 1000ppm
- 2. MDL = Method Detection Limit (方法偵測極限值)
- 3. n.d. = Not Detected (未檢出); 小於MDL / Less than MDL
- 4. "-" = Not Regulated (無規格值)
- 5. \*\*= Qualitative analysis (No Unit) 定性分析(無單位)
- 6. Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
- 7. 全氟辛烷磺酸及其鹽類包含等物質 (PFOS and its salts including):

CAS No.: 1763-23-1, 2795-39-3, 29457-72-5, 29081-56-9, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7, 91036-71-4, 4021-47-0 and others.

- 8. 全氟辛酸及其鹽類包含等物質 (PFOA and its salts including):
  - CAS No.: 335-67-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0, 3825-26-1 and others.
- 9. (#2) =
  - a. 當六價鉻結果大於0.13 μg/cm²,表示樣品表層含有六價鉻。(The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 μg/cm². The sample coating is considered to contain Cr(VI).)
  - b. 當六價鉻結果為n.d. (濃度小於0.10 μg/cm²),表示表層不含六價鉻。(The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 μg/cm²). The coating is considered a non-Cr(VI) based coating)
  - c. 當六價鉻結果介於 0.10 及 0.13 μg/cm² 時,無法確定塗層是否含有六價鉻。(The result between 0.10 μg/cm² and 0.13 μg/cm² is considered to be inconclusive unavoidable coating variations may influence the determination.)
- 10. 除非另有說明,參照ILAC-G8:09/2019,採用簡單二元(w=0)允收規則進行符合性判定;根據此規則,符合性結果之判定係以測試結果與限值做比較。(Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.)



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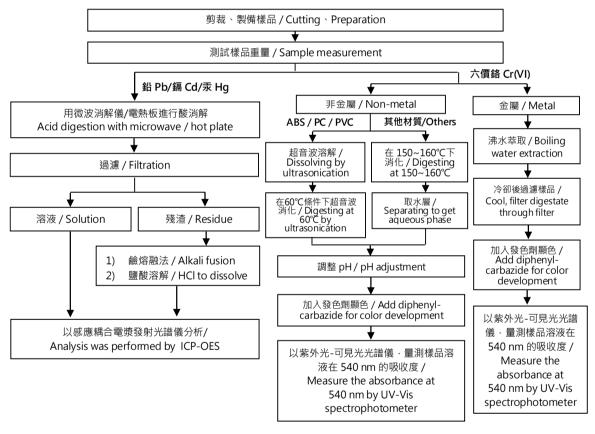
利汎科技股份有限公司 (LeFram TECHNOLOGY CORP.)

新竹縣關西鎮大同里13鄰水坑40號 (NO. 40, SHUI-KEN, LIN 13, TATUNG LI, KUAN HIS, HSINCHU, TAIWAN R.O.C.)

#### 重金屬流程圖 / Analytical flow chart of heavy metal

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. ( $Cr^{6+}$  test method excluded)



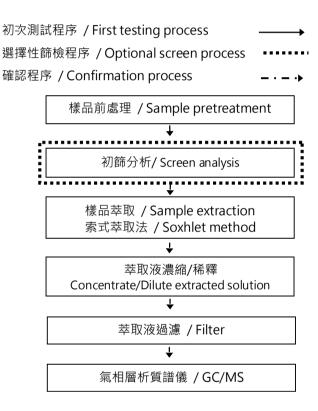


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#### 多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBBs/PBDEs





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可塑劑分析流程圖 / Analytical flow chart - Phthalate

【測試方法/Test method: IEC 62321-8】

樣品前處理/分樣 / Sample pretreatment/separation

樣品以 THF 四氫呋喃溶解萃取 / Sample dissolved/extracted by THF

萃取液稀釋 / Dilute extracted solution

氣相層析質譜儀分析 / Analysis was performed by GC/MS



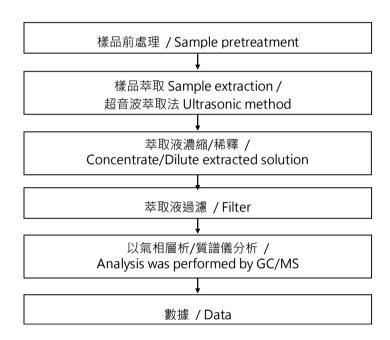
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#### 六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD



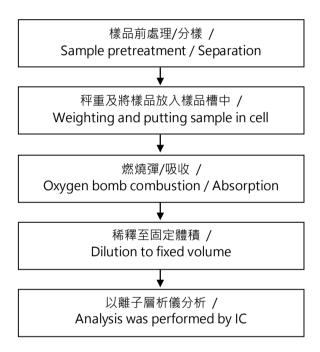


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#### 鹵素分析流程圖 / Analytical flow chart - Halogen



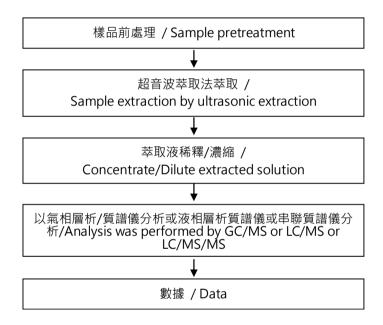


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# 全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)





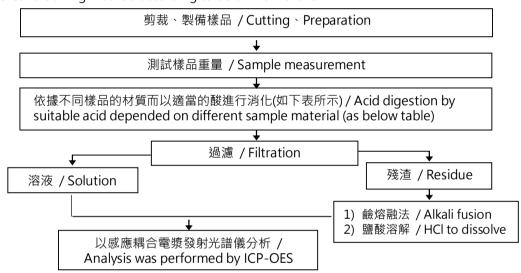
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# 元素以 ICP-OES 分析的消化流程圖 (Flow chart of digestion for the elements analysis performed by ICP-OES)

根據以下的流程圖之條件,樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.



鋼,銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氟酸,雙氧水 / Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
玻璃 / Glass	硝酸,氫氟酸 / HNO₃,HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO <sub>3</sub>
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCI
其他 / Others	加入適當的試劑至完全溶解 / Added appropriate reagent to total digestion



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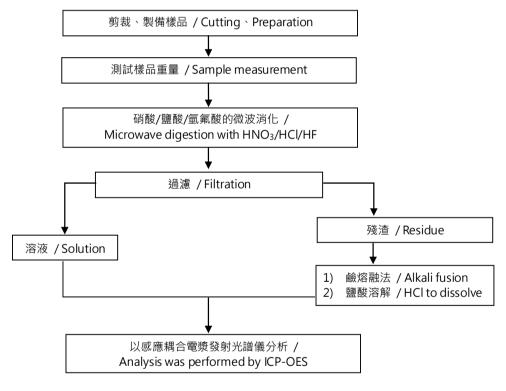
新竹縣關西鎮大同里13鄰水坑40號 (NO. 40, SHUI-KEN, LIN 13, TATUNG LI, KUAN HIS, HSINCHU, TAIWAN R.O.C.)

#### 元素(含重金屬)分析流程圖 / Analytical flow chart of elements (Heavy metal included)

根據以下的流程圖之條件,樣品已完全溶解。

These samples were dissolved totally by pre-conditioning method according to below flow chart.

【參考方法/Reference method: US EPA 3051A、US EPA 3052】



\* US EPA 3051A 方法未添加氫氟酸 / US EPA 3051A method does not add HF.



# **Test Report**

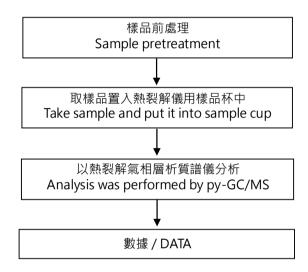
號碼(No.): ETR23803628 日期(Date): 24-Aug-2023

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利汎科技股份有限公司 (LeFram TECHNOLOGY CORP.)

新竹縣關西鎮大同里13鄰水坑40號 (NO. 40, SHUI-KEN, LIN 13, TATUNG LI, KUAN HIS, HSINCHU, TAIWAN R.O.C.)

#### 紅磷分析流程 / Analytical flow chart - Red phosphorus





# **Test Report**

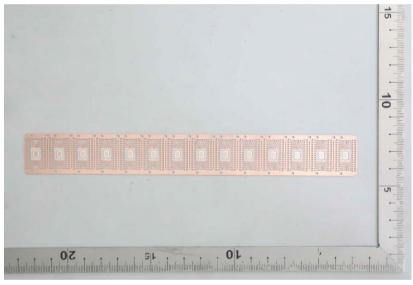
號碼(No.): ETR23803628 日期(Date): 24-Aug-2023

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利汎科技股份有限公司 (LeFram TECHNOLOGY CORP.) 新竹縣關西鎮大同里13鄰水坑40號 (NO. 40, SHUI-KEN, LIN 13, TATUNG LI, KUAN HIS, HSINCHU, TAIWAN R.O.C.)

\* 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.)

### ETR23803628



\*\* 報告結尾 (End of Report) \*\*