

測試報告

Test Report

頁數(Page): 1 of 15 號碼(No.): ETR23B04731M01 日期(Date): 04-Dec-2023

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)

國年企業股份有限公司 (BANDL INTERNATIONAL CORPORATION)

樣品名稱(Sample Name)

MATT TIN PLATING SAMPLE (霧錫面鍍品)

收件日(Sample Receiving Date)

27-Nov-2023

測試期間(Testing Period)

27-Nov-2023 to 04-Dec-2023

測試需求(Test Requested)

(1) 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).)

測試結果(Test Results)

論(Conclusion)

(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.)

(1) 根據客戶所提供的樣品·其鎘、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 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.)

roy Chand / Department Maka Signed for and on behalf SĞS TAIWAN LTD. Chemical Laboratory - Taipei



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測試部位敘述 (Test Part Description)

No.1 : 銀白色金屬鍍層 (PLATING LAYER OF SILVER-WHITE METAL)

No.2 : 銀白色金屬 (含鍍層) (SILVER-WHITE METAL (INCLUDING THE PLATING LAYER))

測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結 (Res	果 sult)	限值 (Limit)
				No.1	No.2	
鎘 (Cd) (Cadmium (Cd))	酸洗脫鍍層·參考IEC 62321-5: 2013· 以感應耦合電漿發射光譜儀分析。(IEC 62321-5: 2013 application of	mg/kg	2	n.d.		100
鉛 (Pb) (Lead (Pb))	modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	47.8		1000
汞 (Hg) (Mercury (Hg))	酸洗脫鍍層·參考IEC 62321-4: 2013+AMD1: 2017·以感應耦合電漿發射光譜儀分析。(IEC 62321-4: 2013+AMD1: 2017 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.		1000
六價鉻 (Hexavalent Chromium) Cr(VI) (#2)	參考IEC 62321-7-1: 2015·以紫外光- 可見光分光光度計分析。(With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.)	μg/cm²	0.1	n.d.		-



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測試項目	測試方法	單位	MDL	結果		限值
(Test Items)	(Method)	(Unit)		(Res	sult)	(Limit)
				No.1	No.2	
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)		mg/kg	5		n.d.	-
五溴聯苯 (Pentabromobiphenyl)		mg/kg	5		n.d.	ı
六溴聯苯 (Hexabromobiphenyl)		mg/kg	5		n.d.	1
七溴聯苯 (Heptabromobiphenyl)		mg/kg	5		n.d.	1
八溴聯苯 (Octabromobiphenyl)		mg/kg	5		n.d.	1
九溴聯苯 (Nonabromobiphenyl)		mg/kg	5		n.d.	ı
十溴聯苯 (Decabromobiphenyl)	参考IEC 62321-6: 2015,以氣相層析儀	mg/kg	5		n.d.	-
多溴聯苯總和 (Sum of PBBs)	/質譜儀分析。(With reference to IEC	mg/kg	-		n.d.	1000
一溴聯苯醚 (Monobromodiphenyl ether)	62321-6: 2015, analysis was	mg/kg	5		n.d.	-
二溴聯苯醚 (Dibromodiphenyl ether)	performed by GC/MS.)	mg/kg	5		n.d.	-
三溴聯苯醚 (Tribromodiphenyl ether)		mg/kg	5		n.d.	-
四溴聯苯醚 (Tetrabromodiphenyl ether)		mg/kg	5		n.d.	-
五溴聯苯醚 (Pentabromodiphenyl ether)		mg/kg	5		n.d.	-
六溴聯苯醚 (Hexabromodiphenyl ether)		mg/kg	5		n.d.	-
七溴聯苯醚 (Heptabromodiphenyl ether)		mg/kg	5		n.d.	-
八溴聯苯醚 (Octabromodiphenyl ether)		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	-		n.d.	1000
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl		mg/kg	50		n.d.	1000
benzyl phthalate (BBP))						
鄰苯二甲酸二丁酯 (DBP) (Dibutyl	参考IEC 62321-8: 2017,以氣相層析儀	mg/kg	50		n.d.	1000
phthalate (DBP))	/質譜儀分析。(With reference to IEC					
鄰苯二甲酸二(2-乙基己基)酯 (DEHP)	62321-8: 2017, analysis was	mg/kg	50		n.d.	1000
(Di-(2-ethylhexyl) phthalate (DEHP))	performed by GC/MS.)					
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl		mg/kg	50		n.d.	1000
phthalate (DIBP))						



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	(Res		限值 (Limit)
				No.1	No.2	
氟 (F) (Fluorine (F)) (CAS No.: 14762-94-8)		mg/kg	50		n.d.	-
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-15-1)	参考BS EN 14582: 2016·以離子層析 儀分析。(With reference to BS EN	mg/kg	50		n.d.	-
溴 (Br) (Bromine (Br)) (CAS No.: 10097-32-2)	14582: 2016, analysis was performed by IC.)	mg/kg	50		n.d.	-
碘 (I) (Iodine (I)) (CAS No.: 14362-44-8)		mg/kg	50		n.d.	-
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)	參考US EPA 3050B: 1996 · 以感應耦合 電漿發射光譜儀分析。(With reference to US EPA 3050B: 1996, analysis was performed by ICP-OES.)	mg/kg	2		n.d.	-
銻 (Sb) (Antimony (Sb)) (CAS No.: 7440-36-0)	参考US EPA 3050B: 1996 · 以感應耦合 電漿發射光譜儀分析。(With reference to US EPA 3050B: 1996, analysis was performed by ICP-OES.)	mg/kg	2	-	n.d.	-
	參考IEC 62321: 2008.以氣相層析儀/ 質譜儀分析。(With reference to IEC 62321: 2008, analysis was performed by GC/MS.)	mg/kg	5	1	n.d.	-
全氟辛烷磺酸及其鹽類 (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	參考CEN/TS 15968: 2010 · 以液相層析 串聯質譜儀分析。(With reference to CEN/TS 15968: 2010, analysis was	μg/m²	0.5	n.d.		-
全氟辛酸及其鹽類 (PFOA and its salts) (CAS No.: 335-67-1 and its salts)	performed by LC/MS/MS.)	μg/m²	0.5	n.d.		-

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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. "---" = Not Conducted (未測試項目)
- 6. (#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.)
- 7. 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.)
- 8. 本報告為 ETR23B04731 之異動報告。(This is the additional test report of ETR23B04731.)



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PFAS Remark:

現有PFAS定量技術是分析PFAS物質的特定結構,但同碳數族群之PFAS酸及鹽類物質,其可被辨識的特定結構相同,因此無法區別所分析的特定結構是來自酸或者鹽類,故測試結果為同碳數族群之PFAS之酸及鹽類物質的濃度總合。下表PFAS物質濃度皆已包含在測試結果中,相關資訊請參見下表:(下表列舉PFAS物質僅為範例,並不包含所有同碳數族群之PFAS鹽類。)

(The quantitative technology of PFAS is to analyze the specific structure of PFAS substances. However, PFAS acid and its salts with the same carbon number group have the same specific structure that can be identified. The tested results of the analyzed specific structure cannot be distinguished to identify the contribution from PFAS acid or its salts. Therefore, the tested results display the sum of concentrations of PFAS acids and its salts with the same carbon number group. The concentration of PFAS substances in the below table have been included in the tested results, please refer to the table for relevant information: (The listed PFAS substances are examples only, it do not include all PFAS salts with the same carbon number group.))

物質濃度分類 (Classification of Substance Concentration)	物質名稱 (Substance Name)	CAS No.
全氟辛烷磺酸及其鹽類 Perfluorooctane sulfonates and	全氟辛基磺酸鉀 (PFOS-K) Potassium perfluorooctanesulfonate (PFOS-K)	2795-39-3
its salts (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	全氟辛基磺酸鋰 (PFOS-Li) Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)	29457-72-5
	全氟辛基磺酸銨 (PFOS-NH ₄) Perfluorooctanesulfonic acid, ammonium salt (PFOS-NH ₄)	29081-56-9
	全氟辛基磺酸二乙醇銨 (PFOS-NH(OH) $_2$) Perfluorooctane sulfonate diethanolamine salt (PFOS-NH(OH) $_2$)	70225-14-8
	全氟辛基磺酸四乙基銨 (PFOS-N(C_2H_5) $_4$) Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-N(C_2H_5) $_4$)	56773-42-3
	全氟辛基磺酸二癸二甲基銨 (PFOS-DDA) N-decyl-N,N-dimethyldecan-1-aminium 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8- heptadecafluorooctane-1-sulfonate (PFOS-DDA)	251099-16-8



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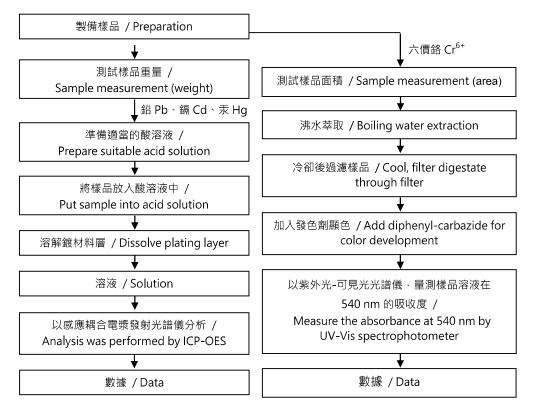
物質濃度分類 (Classification of Substance Concentration)	物質名稱 (Substance Name)	CAS No.
全氟辛烷磺酸及其鹽類 Perfluorooctane sulfonates and its salts (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	全氟辛基磺醯氟 (POSF) Perfluorooctane sulfonyl fluoride (POSF)	307-35-7
	全氟辛基磺酸鎂 (PFOS-Mg) Perfluorooctanesulfonic acid, magnesium salt (PFOS-Mg)	91036-71-4
	全氟辛基磺酸鈉 (PFOS-Na) Perfluorooctanesulfonic acid, sodium salt (PFOS-Na)	4021-47-0
全氟辛酸及其鹽類 Perfluorooctanoic acid and its salts (PFOA and its salts) (CAS No.: 335-67-1 and its salts)	全氟辛酸鈉 (PFOA-Na) Sodium perfluorooctanoate (PFOA-Na)	335-95-5
	全氟辛酸鉀 (PFOA-K) Potassium perfluorooctanoate (PFOA-K)	2395-00-8
	全氟辛酸銀 (PFOA-Ag) Silver perfluorooctanote (PFOA-Ag)	335-93-3
	全氟辛氟 (PFOA-F) Perfluorooctanoyl fluoride (PFOA-F)	335-66-0
	全氟辛酸銨 (APFO) Ammonium pentadecafluorooctanoate (APFO)	3825-26-1
	全氟辛酸鋰 (PFOA-Li) Lithium perfluorooctanoate (PFOA-Li)	17125-58-5



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鍍層重金屬測試流程圖 / Flow chart of stripping method for metal analysis

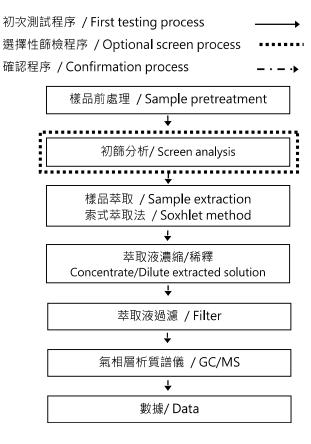
根據以下的流程圖之條件,樣品之外部鍍層已完全溶解。(六價鉻測試方法除外) / The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)





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

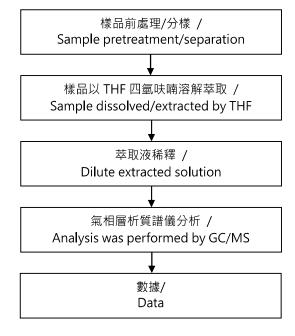




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可塑劑分析流程圖 / Analytical flow chart - Phthalate

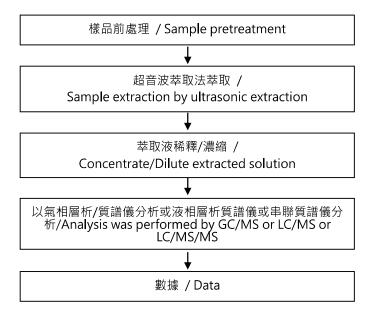
【測試方法/Test method: IEC 62321-8】





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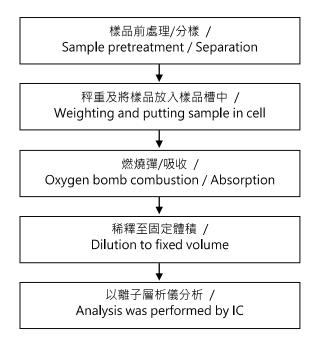
全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)





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



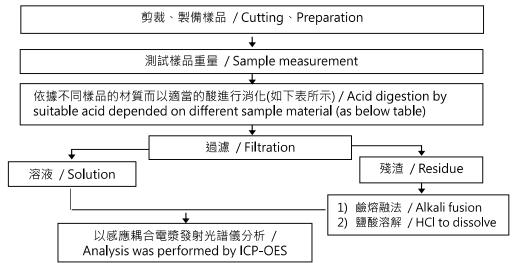


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元素以 ICP-OES 分析的消化流程圖

(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.

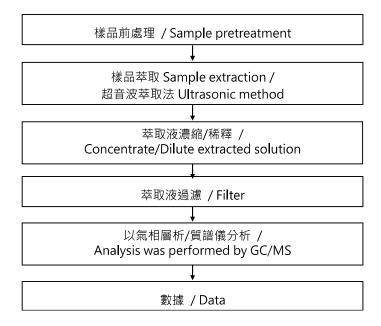


鋼,銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氟酸,雙氧水 / Aqua regia, HNO ₃ , HCl, HF, H ₂ O ₂
玻璃 / Glass	硝酸,氫氟酸 / HNO ₃ ,HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO ₃
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , HCl
其他 / Others	加入適當的試劑至完全溶解 /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



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





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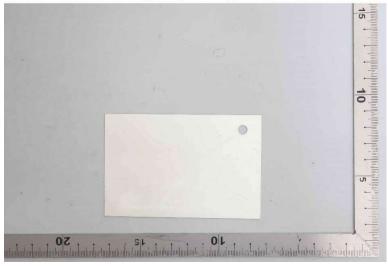
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* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. * (The tested sample / part is marked by an arrow if it's shown on the photo.)

ETR23B04731 NO.1



ETR23B04731 NO.2



** 報告結尾 (End of Report) **

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