

Report No. 報告號碼: 48250911b 001

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Client 客戶: First Hi-tec Enterprise Co. Ltd./ 高技企業股份有限公司
No.3, Lane 43, Hsing Pang Rd., Taoyuan District, Taoyuan City 330, Taiwan,
R.O.C./ 台灣 330 桃園市桃園區興邦路 43 巷 3 號

Test item(s) 測試樣品: PCB board

Identification/Model No(s): 鋁基板 Aluminum substrate
樣品描述/規格:

Sample obtaining method: Sending by customer
樣品獲取方式:

Condition at delivery: Test item complete and undamaged.
樣品接收狀態:

Sample receiving date: 2024-08-08
收樣日期:

Testing period: 2024-08-08 – 2024-08-20
測試週期:

Place of testing: TÜV Rheinland Hong Kong Ltd.
測試地點:

Test specification 測試要求:

Test result 測試結果:

According to RoHS (recast): Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, 2011/65/EU Annex II and its amendment Directive (EU) 2015/863: Total Content of Lead, Cadmium, Mercury, Chromium VI, Polybrominated Biphenyls, Polybrominated Diphenyl Ethers; and Benzylbutyl phthalate (BBP), Dibutyl phthalate (DBP), Bis(2-ethylhexyl) phthalate (DEHP), Diisobutyl phthalate (DIBP) / 依據電機電子設備限用有害物質指令(RoHS 2011/65/EU) 附錄 II 及其修正指令 (EU) 2015/863: 鉛、鎘、汞、六價鉻、多溴聯苯、多溴二苯醚、鄰苯二甲酸苯基丁酯、鄰苯二甲酸二丁酯、鄰苯二甲酸二(2-乙基己基)酯、鄰苯二甲酸二異丁酯 之總含量

Pass/合格

Phthalates/鄰苯二甲酸酯類 (DIDP/DINP/DNOP), Perfluorooctane Sulfonate (PFOS)/ 全氟辛烷磺酸, Perfluorooctanoic Acid (PFOA)/ 全氟辛酸, Hexabromocyclododecane (HBCDD)/ 六溴環十二烷

Refer to result page
參照測試報告

For and on behalf of
TÜV Rheinland Taiwan Ltd.


2024-08-22
Date 日期
Arthur Cheng/Project Manager
Name/Position 姓名/職位



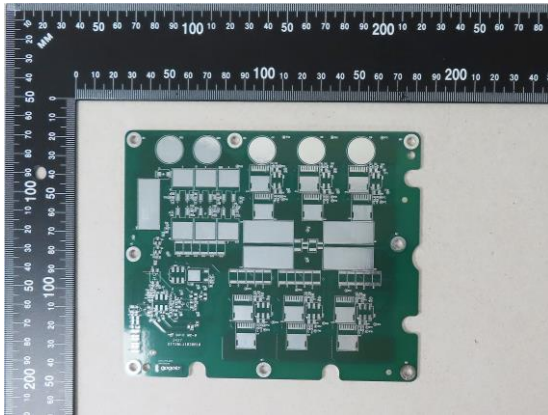
Sample information is provided by customer. Test result is drawn according to the kind and extent of tests performed. This test report relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products. "Decision Rule" document announced in our website (<https://www.tuv.com/landingpage/en/qm-gcn/>) describes the statement of conformity and its rule of enforcement for test results are applicable throughout this test report. 樣品信息由客戶提供。測試結果根據所做測試的種類和範圍而得出。本測試報告僅對來樣負責。未經本測試中心許可，測試報告不得部分複製。不能根據此報告在上述產品或類似產品上使用任何安全標誌。本測試報告中，描述符合性聲明所應用的判定規則發佈在我司官網 <https://www.tuv.com/landingpage/en/qm-gcn/>。

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第2頁共9頁**Material list/材料清單**

Item: 鋁基板 Aluminum substrate

Material No./ 材料編號	Material/材質	Color/顏色	Location/位置
1	PCB board (Metal+Coating/金屬+鍍層)	Green/綠色	TCL240808-10

Test Sample/測試樣品

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Test Method/測試方法 : Total Cadmium/鎘, Lead/鉛, Mercury/汞, Chromium/鉻
 - Ref. to/參考 IEC 62321-4:2013 and IEC 62321-5:2013
 Chromium (VI)/六價鉻
 - For Metal material/金屬 - Ref. to IEC 62321-7-1:2015
 - For Polymer, Electronic material or others materials/聚合物, 電子材料或者其他材料 – Ref. to IEC 62321-7-2:2017
 PBBs/多溴聯苯, PBDEs/多溴二苯醚 - Ref. to/參考 IEC 62321-6:2015

Material No./材料編號			Mat.1
Parameter / 測試項目	Unit / 單位	MDL	Result / 結果
Cadmium (Cd) / 鎘	mg/kg	2	n.d.
Lead (Pb) / 鉛	mg/kg	2	n.d.
Mercury (Hg) / 汞	mg/kg	2	n.d.
Chromium VI (Cr VI) / 六價鉻*	µg/cm ²	0.1	n.d.
Sum of Polybrominated biphenyls (PBBs) / 多溴聯苯	mg/kg	-	n.d.
Monobromobiphenyl	mg/kg	5	n.d.
Dibromobiphenyl	mg/kg	5	n.d.
Tribromobiphenyl	mg/kg	5	n.d.
Tetrabromobiphenyl	mg/kg	5	n.d.
Pentabromobiphenyl	mg/kg	5	n.d.
Hexabromobiphenyl	mg/kg	5	n.d.
Heptabromobiphenyl	mg/kg	5	n.d.
Octabromobiphenyl	mg/kg	5	n.d.
Nonabromobiphenyl	mg/kg	5	n.d.
Decabromobiphenyl	mg/kg	5	n.d.
Sum of Polybrominated diphenyl ethers (PBDEs) / 多溴二苯醚	mg/kg	-	n.d.
Monobromodiphenyl ether	mg/kg	5	n.d.
Dibromodiphenyl ether	mg/kg	5	n.d.
Tribromodiphenyl ether	mg/kg	5	n.d.
Tetrabromodiphenyl ether	mg/kg	5	n.d.
Pentabromodiphenyl ether	mg/kg	5	n.d.
Hexabromodiphenyl ether	mg/kg	5	n.d.
Heptabromodiphenyl ether	mg/kg	5	n.d.
Octabromodiphenyl ether	mg/kg	5	n.d.
Nonabromodiphenyl ether	mg/kg	5	n.d.
Decabromodiphenyl ether	mg/kg	5	n.d.

Notes/ 註釋:

- MDL = Method Detection Limit/方法偵測極限值
- n.d. = Not Detected/未檢出 ; Less than MDL/小於 MDL
- mg/kg = milligram per kilogram/毫克每公斤
- * Once the total Cr content in metal/ plastic or electronic sample is found to be exceeded the limit, the Cr (VI) content will be confirmed with reference to IEC 62321-7-1:2015/ IEC 62321-7-2:2017/ 一旦金屬/塑膠/電子樣品內總鉻含量超過最大允許限值, 六價鉻含量將依照 IEC 62321-7-1:2015/ IEC 62321-7-2:2017 進行確認。

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Chromium (VI) concentration 六價鉻含量	Qualitative result 定性結果
<0.1µg/cm ²	The sample is negative (-ve) for Cr(VI). The Cr(VI) concentration is below the limit of quantification. The coating is considered a non-Cr(VI) based coating. 樣品六價鉻測定結果為陰性。 六價鉻濃度低於定量限，塗層視為非六價鉻塗層。
≥0.1µg/cm ² and ≤0.13 µg/cm ²	The result is considered to be inconclusive. Unavoidable coating variations may influence the determination. Recommendation: if additional samples are available, perform a total of 3 trials to increase sampling surface area. Use the averaged result of the 3 trials for the final determination. 六價鉻測定結果為無法判定。 塗層的差異不可避免的可能影響測定。 推薦：如果有額外的樣品，測試加大樣品表面積的三平行樣。以三平行測試的平均值作為最終測定結果。
>0.13 µg/cm ²	The sample is positive (+ve) for Cr(VI). Concentration is above the limit of quantification and the statistical margin of error. The sample coating is considered to contain Cr(VI). 六價鉻測試結果為陽性。六價鉻濃度高於定量限及統計誤差幅度。樣品塗層視為含有六價鉻。

Maximum permissible Limit acc. to 2011/65/EU (mg/kg) / 允許限值	Cd/鎘	Cr(VI)/ 六價鉻	Pb/鉛	Hg/汞	PBBs/ 多溴聯苯	PBDEs/ 多溴二苯醚
	100	1000	1000	1000	1000	1000

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Test Method/測試方法: BBP/DBP/DEHP/DIBP/DNOP/DIDP/DINP – Ref. to/參考 IEC 62321-8:2017

Material No./材料編號			Mat.1
Parameter / 測試項目	Unit / 單位	MDL	Result / 結果
Benzylbutylphthalate (BBP) /鄰苯二甲酸苯基丁酯	mg/kg	50	n.d.
Dibutylphthalate (DBP) /鄰苯二甲酸二丁酯	mg/kg	50	n.d.
Diethylhexylphthalate (DEHP) /鄰苯二甲酸二(2-乙基己基)酯	mg/kg	50	n.d.
Diisobutylphthalate (DIBP) /鄰苯二甲酸二異丁酯	mg/kg	50	n.d.
Diisodecylphthalate (DIDP) /鄰苯二甲酸二異癸酯	mg/kg	50	n.d.
Diisononylphthalate (DINP) /鄰苯二甲酸二異壬酯	mg/kg	50	n.d.
Di-n-octylphthalate (DNOP) /鄰苯二甲酸二辛酯	mg/kg	50	n.d.

Notes/ 註釋:

- MDL = Method Detection Limit/方法偵測極限值
- n.d. = Not Detected/未檢出; Less than MDL/小於 MDL
- mg/kg = milligram per kilogram/毫克每公斤

Maximum permissible Limit acc. to (EU) 2015/863 (mg/kg) / 允許限值	BBP 鄰苯二甲酸 苯基丁酯	DBP 鄰苯二甲酸 二丁酯	DEHP 鄰苯二甲酸二(2- 乙基己基)酯	DIBP 鄰苯二甲酸 二異丁酯
	1000	1000	1000	1000

Test Method/測試方法: PFOS/全氟辛烷磺酸/ PFOA/全氟辛酸 - Ref. to/參考 CEN/TS 15968:2010

Material No./材料號碼			Mat.1
Parameter/測試項目	Unit/ 單位	MDL	Result / 結果
Perfluorooctane Sulfonate (PFOS) / 全氟辛烷磺酸	mg/kg	0.01	n.d.
Perfluorooctanoic Acid (PFOA) / 全氟辛酸	mg/kg	0.01	n.d.

Abbreviation: MDL = Method Detection Limit/方法偵測極限值
n.d. = Not Detected/未檢出; Less than MDL/小於 MDL
mg/kg = milligram per kilogram/毫克每公斤

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Test Method/測試方法: HBCDD/六溴環十二烷 - Organic solvent extraction, GCMS

Material No./

材料號碼

Mat.1

Parameter / 測試項目	Unit / 單位	MDL	Result / 結果
Hexabromocyclododecane (HBCDD)/ 六溴環十二烷	mg/kg	10	n.d.

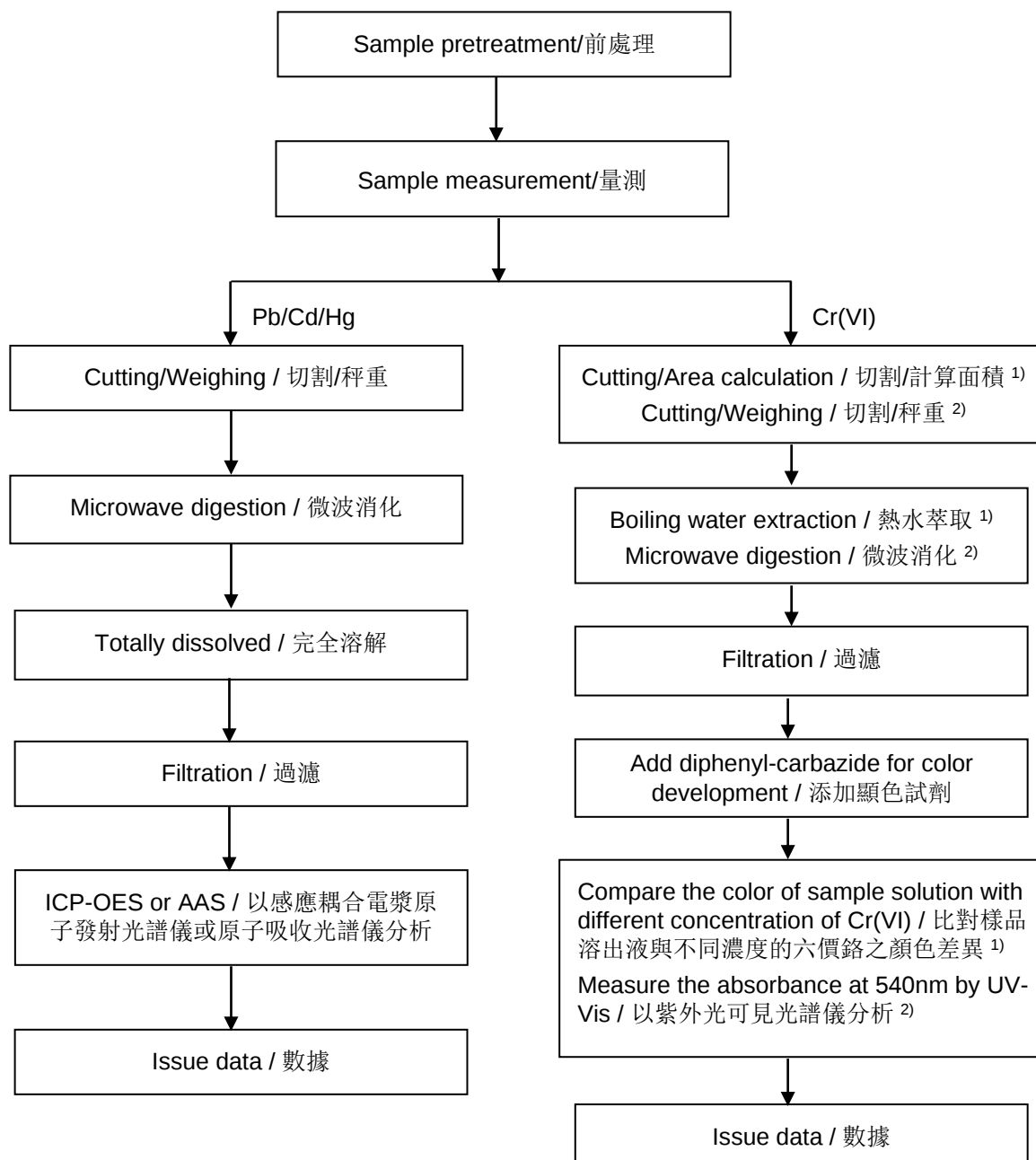
Abbreviation : MDL = Method Detection Limit/方法偵測極限值

n.d. = Not Detected/未檢出 ; Less than MDL/小於 MDL

mg/kg = milligram per kilogram/毫克每公斤

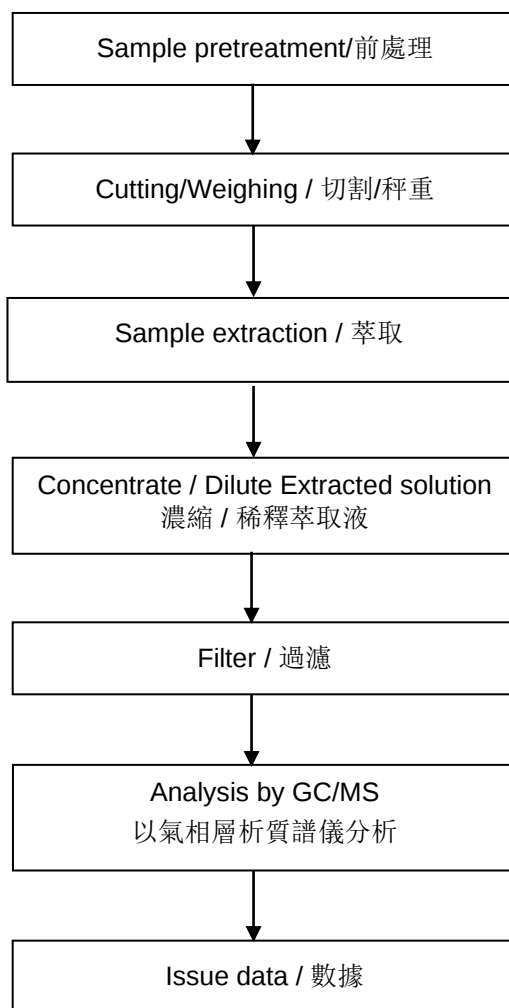
Testing procedure / 測試流程圖:

RoHS (Pb/鉛, Cd/鎘, Hg/汞, Cr(VI)/六價鉻)

Notes/ 註釋: ¹⁾ For metallic material / 用於金屬物質²⁾ For non-metallic material / 用於非金屬物質

Testing procedure / 測試流程圖：

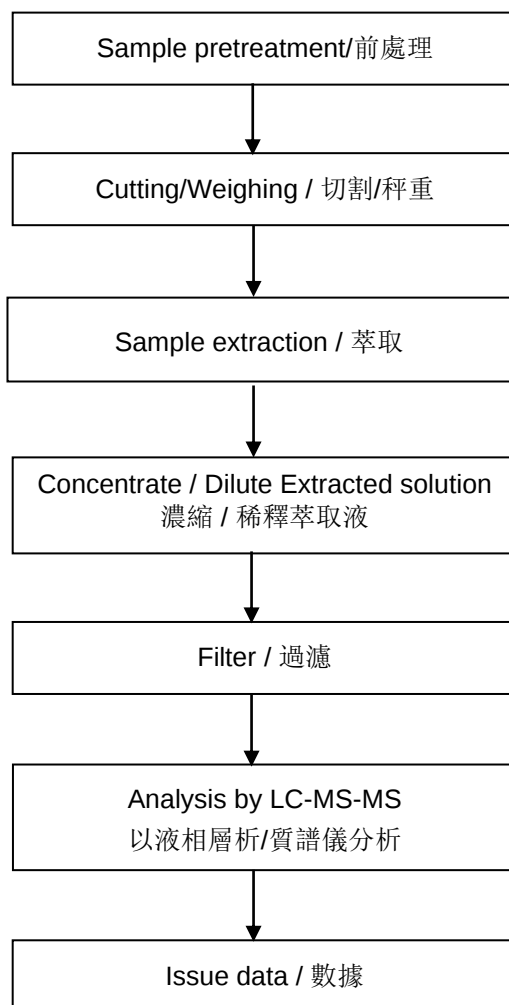
RoHS (PBBs/多溴聯苯, PBDEs/多溴二苯醚, BBP/鄰苯二甲酸苯基丁酯、DBP/鄰苯二甲酸二丁酯、DEHP/鄰苯二甲酸二(2-乙基己基)酯、DIBP/鄰苯二甲酸二異丁酯); Phthalates/鄰苯二甲酸酯類, HBCDD/六溴環十二烷



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第9頁 共9頁**Testing procedure / 測試流程圖:**

PFOS/全氟辛烷磺酸, PFOA/全氟辛酸



--- End of Test-Report / 此報告結束---