

Test Report

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高柏科技有限公司 T-GLOBAL TECHNOLOGY CO., LTD.

桃園市桃園區大仁路50巷33號

NO. 33, LN. 50, DAREN RD., TAOYUAN DISTRICT, TAOYUAN CITY 33068, 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/on behalf of the applicant as):

樣品名稱(Sample Description) HEAT SPREADER (散熱銅片)

樣品型號(Style/Item No.) PH3

收件日期(Sample Receiving Date) 2015/11/05

測試期間(Testing Period) 2015/11/05 TO 2015/11/11

測試需求(Test Requested):

(1) 依據客戶指定,參考RoHS2011/65/EU Annex II及其修訂指令(EU) 2015/863測試編、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, DEHP, DIBP contents in the submitted sample.)

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

請見下一頁 (Please refer to next pages). 測試結果(Test Results) :



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測試結果(Test Results)

測試部位(PART NAME)No.1 : 黑色/銅色片狀 (BLACK/COPPER COLORED SHEET)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) No.1
鎬 / Cadmium (Cd)	mg/kg	參考IEC 62321-5: 2013方法, 以感應耦合 電漿原子發射光譜儀檢測. / With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	n. d.
鉛 / Lead (Pb)	mg/kg	參考IEC 62321-5: 2013方法, 以感應耦合 電漿原子發射光譜儀檢測. / With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	n. d.
汞 / Mercury (Hg)	mg/kg	參考IEC 62321-4: 2013方法,以感應耦合 電漿原子發射光譜儀檢測. / With reference to IEC 62321-4: 2013 and performed by ICP-AES.	2	n. d.
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	參考IEC 62321: 2008 - Annex C方法,以UV-VIS檢測. / With reference to IEC 62321: 2008 - Annex C and performed by UV-VIS.	2	n. d.
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	參考US EPA 3550C: 2007方法,以液相層析/質譜儀檢測. / With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n. d.
全氟辛酸 / PFOA (CAS No.: 335-67-1)	mg/kg	参考US EPA 3550C: 2007方法,以液相層析/質譜儀檢測. / With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n. d.



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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) No.1
多溴聯苯總和 / Sum of PBBs	mg/kg		-	n. d.
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.
六溴聯苯 / Hexabromobiphenyl	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	參考IEC 62321-6: 2015方法, 以氣相層析/ 新姓(基)公司	5	n. d.
多溴聯苯醚總和 / Sum of PBDEs	mg/kg	質譜儀檢測. / With reference to IEC 62321-6: 2015 and performed by GC/MS.	-	n. d.
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg	02021 0. 2010 and performed by 60% mo.	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	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.



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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result) No.1
六溴環十二烷及所有主要被辨別出的異構物 / Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α - HBCDD, β - HBCDD, γ - HBCDD) (CAS No.: 25637-99-4 and 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))		參考IEC 62321: 2008方法,以氣相層析/質譜儀檢測. / With reference to IEC 62321: 2008 method. Analysis was performed by GC/MS.	5	n. d.
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	参考IEC 62321-8 (111/321/CD),以氣相層析儀/質譜儀檢測之. / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n. d.
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50	n. d.
鄰苯二甲酸二 (2-乙基己基)酯 / DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg		50	n. d.
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50	n. d.
鄰苯二甲酸二異癸酯 / DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	mg/kg		50	n. d.
鄰苯二甲酸二異壬酯 / DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)	mg/kg		50	n. d.
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg		50	n. d.



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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result)
			(MDL)	No. 1
鹵素 / Halogen				
鹵素(氟)/ Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	参考BS EN 14582:2007,以離子層析儀分析./ With reference to BS EN 14582:2007.Analysis was performed by IC.	50	n. d.
鹵素 (氣) / Halogen-Chlorine (C1) (CAS No.: 22537-15-1)	mg/kg		50	n. d.
鹵素(溴)/ Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n. d.
鹵素(碘)/ Halogen-Iodine(I)(CAS No.: 14362-44-8)	mg/kg		50	n. d.

備註(Note):

- 1. mg/kg = ppm ; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected (未檢出)
- 3. MDL = Method Detection Limit (方法偵測極限值)
- 4. "-" = Not Regulated (無規格值)

PFOS参考資訊(Reference Information): 持久性有機污染物 POPs - (EU) 757/2010

PFOS濃度在物質或製備中不得超過0.001%(10ppm),在半成品、成品或零部件中不得超過0.1%(1000ppm),在紡織品或塗 層材料中不得超過1µg/m²。

(Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above $1\mu g/m^2$.)



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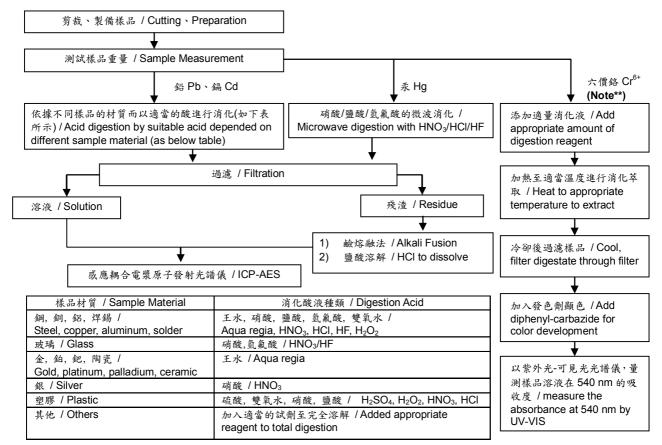
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- 根據以下的流程圖之條件,樣品已完全溶解。(六價鉻測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)
- 測試人員:楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 測試負責人: 張啟興 / Name of the person in charge of measurement: Troy Chang



Note** (For IEC 62321)

- (1) 針對非金屬材料加入鹼性消化液,加熱至 90~95℃萃取. / For non-metallic material, add alkaline digestion reagent and heat to 90~95°C
- (2) 針對金屬材料加入純水,加熱至沸騰萃取. / For metallic material, add pure water and heat to boiling.



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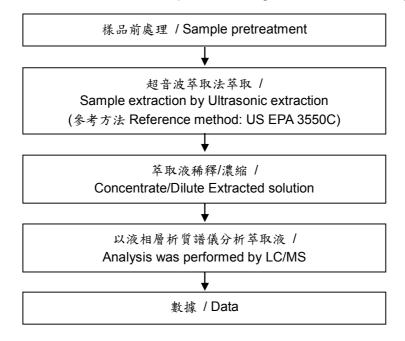
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全氟辛酸/全氟辛烷磺酸分析流程圖 / PFOA/PFOS analytical flow chart

- 測試人員: 翁賜彬 / Name of the person who made measurement: Roman Wong
- 測試負責人:張啟興 / Name of the person in charge of measurement: Troy Chang





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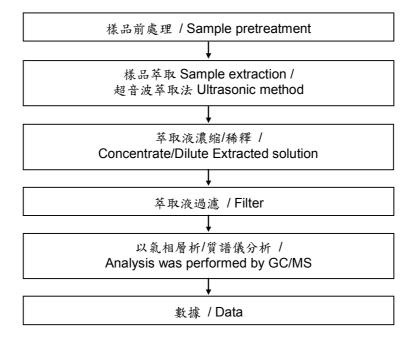
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六溴環十二烷分析流程圖 / HBCDD analytical flow chart

- 測試人員: 翁賜彬 / Name of the person who made measurement: Roman Wong
- 測試負責人: 張啟興 / Name of the person in charge of measurement: Troy Chang





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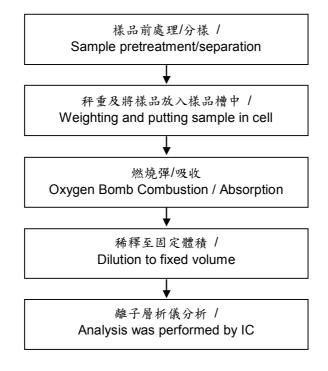
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鹵素分析流程圖 / Analytical flow chart of halogen content

- 測試人員:陳恩臻 / Name of the person who made measurement: Rita Chen
- 測試負責人:張啟興 / Name of the person in charge of measurement: Troy Chang





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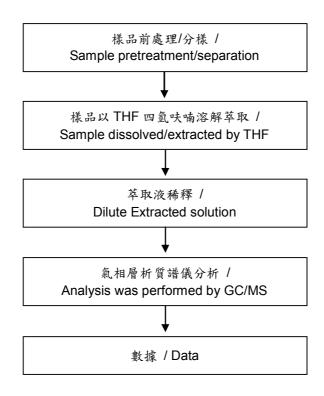
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可塑劑分析流程圖 / Analytical flow chart of phthalate content

- 測試人員:徐毓明 / Name of the person who made measurement: Andy Shu
- 測試負責人:張啟興 / Name of the person in charge of measurement: Troy Chang

【測試方法/Test method: IEC 62321-8】





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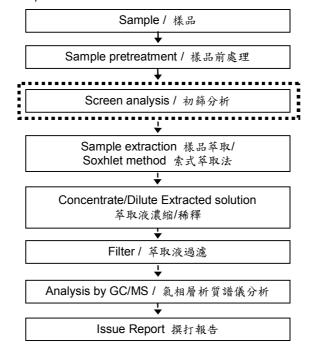
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多溴聯苯/多溴聯苯醚分析流程圖 / PBB/PBDE analytical FLOW CHART

- 測試人員: 翁賜彬 / Name of the person who made measurement: Roman Wong
- 測試負責人: 張啟興 / Name of the person in charge of measurement: Troy Chang

初次測試程序 / First testing process — 選擇性篩檢程序 / Optional screen process ••

確認程序 / Confirmation process - · - · ▶





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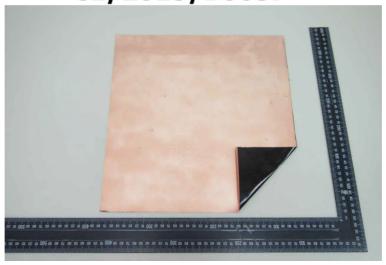
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* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. * (The tested sample / part is marked by an arrow if it's shown on the photo.)

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** 報告結尾 (End of Report) **