

測試報告

Test Report

號碼(No.) : CE/2019/24567

日期(Date) : 2019/03/05

頁數(Page): 1 of 9

旺宏電子股份有限公司

MACRONIX INTERNATIONAL CO., LTD.

新竹科學工業園區研新四路8號

NO. 8, CREATION ROAD IV, SCIENCE PARK, HSIN-CHU, 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):

送樣廠商(Sample Submitted By) : 旺宏電子股份有限公司 (MACRONIX INTERNATIONAL CO., LTD.)
樣品名稱(Sample Description) : IC
樣品型號(Style/Item No.) : 64 CSP
收件日期(Sample Receiving Date) : 2019/02/22
測試期間(Testing Period) : 2019/02/22 to 2019/03/05

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

測試結果(Test Results) : 請參閱下一頁 (Please refer to following pages).


Troy Chang, Manager-Tech
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei



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測試結果(Test Results)

測試部位(PART NAME)No. 1 : 黑色本體 (BLACK BODY)
 測試部位(PART NAME)No. 2 : 銀色金屬 (SILVER COLORED METAL)

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	No. 2
鎘 / Cadmium (Cd)	mg/kg	參考 IEC 62321-5 (2013), 以感應耦合電漿原子發射光譜儀檢測. / With	2	n. d.	n. d.
鉛 / Lead (Pb)	mg/kg	reference to IEC 62321-5 (2013) and performed by ICP-AES.	2	5.45	73.1
汞 / Mercury (Hg)	mg/kg	參考 IEC 62321-4 (2013), 以感應耦合電漿原子發射光譜儀檢測. / With	2	n. d.	n. d.
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	reference to IEC 62321-4 (2013) and performed by ICP-AES.	2	n. d.	n. d.
六價鉻 / Hexavalent Chromium Cr(VI)(#2)	µg/cm ²	參考 IEC 62321-7-2 (2017), 以 UV-VIS 檢測. / With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n. d.	---
六價鉻 / Hexavalent Chromium Cr(VI)(#2)	µg/cm ²	參考 IEC 62321-7-1 (2015), 以 UV-VIS 檢測. / With reference to IEC 62321-7-1 (2015) and performed by UV-VIS.	0.10	---	n. d.
多溴聯苯總和 / Sum of PBBs	mg/kg	參考 IEC 62321-6 (2015), 以氣相層析儀/質譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n. d.	n. d.
一溴聯苯 / Monobromobiphenyl	mg/kg		5	n. d.	n. d.
二溴聯苯 / Dibromobiphenyl	mg/kg		5	n. d.	n. d.
三溴聯苯 / Tribromobiphenyl	mg/kg		5	n. d.	n. d.
四溴聯苯 / Tetrabromobiphenyl	mg/kg		5	n. d.	n. d.
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n. d.	n. d.
六溴聯苯 / Hexabromobiphenyl	mg/kg		5	n. d.	n. d.
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n. d.	n. d.
八溴聯苯 / Octabromobiphenyl	mg/kg		5	n. d.	n. d.
九溴聯苯 / Nonabromobiphenyl	mg/kg		5	n. d.	n. d.
十溴聯苯 / Decabromobiphenyl	mg/kg	5	n. d.	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	No. 2
多溴聯苯醚總和 / Sum of PBDEs	mg/kg	參考IEC 62321-6 (2015), 以氣相層析儀/ 質譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n. d.	n. d.
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg		5	n. d.	n. d.
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg		5	n. d.	n. d.
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n. d.	n. d.
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg		5	n. d.	n. d.
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg		5	n. d.	n. d.
六溴聯苯醚 / Hexabromodiphenyl ether	mg/kg		5	n. d.	n. d.
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg		5	n. d.	n. d.
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg		5	n. d.	n. d.
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg		5	n. d.	n. d.
十溴聯苯醚 / Decabromodiphenyl ether	mg/kg	5	n. d.	n. d.	
鄰苯二甲酸丁苄甲酯 / BBP (Butyl Benzyl phthalate) (CAS No. : 85-68-7)	mg/kg	參考IEC 62321-8 (2017), 以氣相層析儀/ 質譜儀檢測. / With reference to IEC 62321-8 (2017). 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.	---	

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				No. 1	No. 2
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg	參考IEC 62321-8 (2017), 以氣相層析儀/質譜儀檢測. / With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n. d.	---
鄰苯二甲酸二正己酯 / DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3)	mg/kg		50	n. d.	---
鹵素 / Halogen					
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	參考BS EN 14582 (2016), 以離子層析儀分析. / With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	90.6	---
鹵素 (氯) / Halogen-Chlorine (Cl) (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)
5. "---" = Not Conducted (未測項目)
6. (#2) =
 - a. 當六價鉻結果大於0.13 $\mu\text{g}/\text{cm}^2$, 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 $\mu\text{g}/\text{cm}^2$. 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 $\mu\text{g}/\text{cm}^2$), 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 $\mu\text{g}/\text{cm}^2$). The coating is considered a non-Cr(VI) based coating
 - c. 當六價鉻結果介於 0.10 及 0.13 $\mu\text{g}/\text{cm}^2$ 時, 無法確定塗層是否含有六價鉻. / The result between 0.10 $\mu\text{g}/\text{cm}^2$ and 0.13 $\mu\text{g}/\text{cm}^2$ is considered to be inconclusive - unavoidable coating variations may influence the determination.

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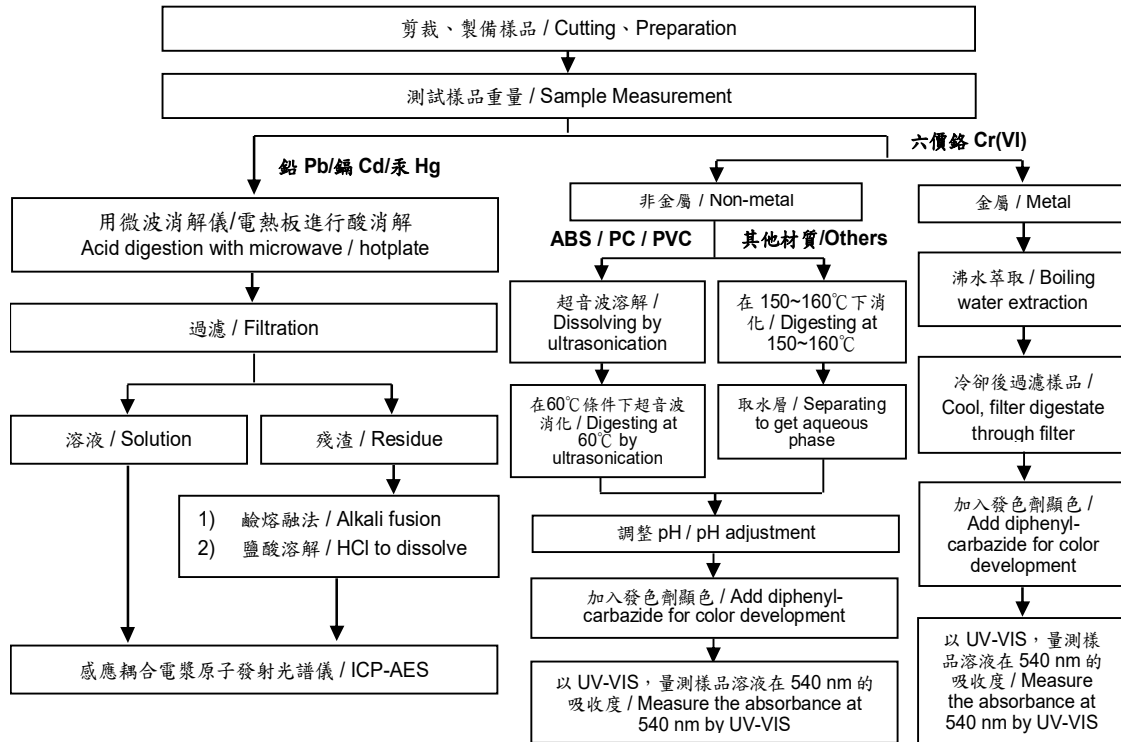
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重金屬流程圖 / Analytical flow chart of Heavy Metal

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. (Cr⁶⁺ test method excluded)

- 測試人員：陳恩臻 / Technician: Rita Chen
- 測試負責人：張啟興 / Supervisor: Troy Chang



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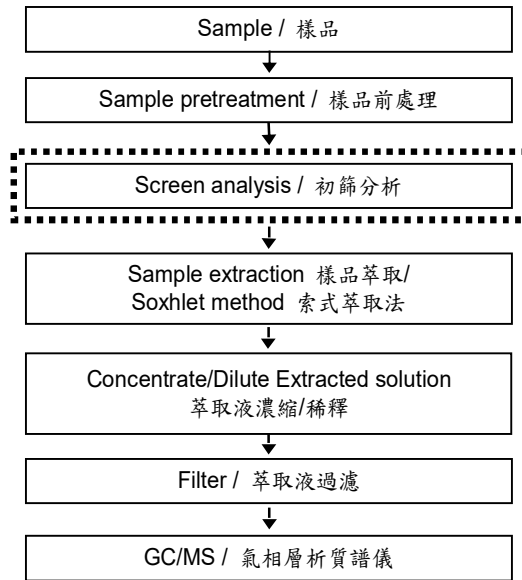
多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBB/PBDE

- 測試人員：涂雅苓 / Technician: Yaling Tu
- 測試負責人：張啟興 / Supervisor: 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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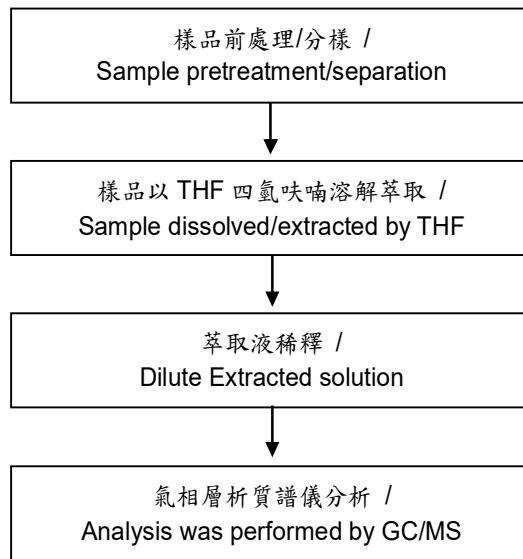
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可塑劑分析流程圖 / Analytical flow chart - Phthalate

- 測試人員：涂雅苓 / Technician: Yaling Tu
- 測試負責人：張啟興 / Supervisor : Troy Chang

【測試方法/Test method: IEC 62321-8】



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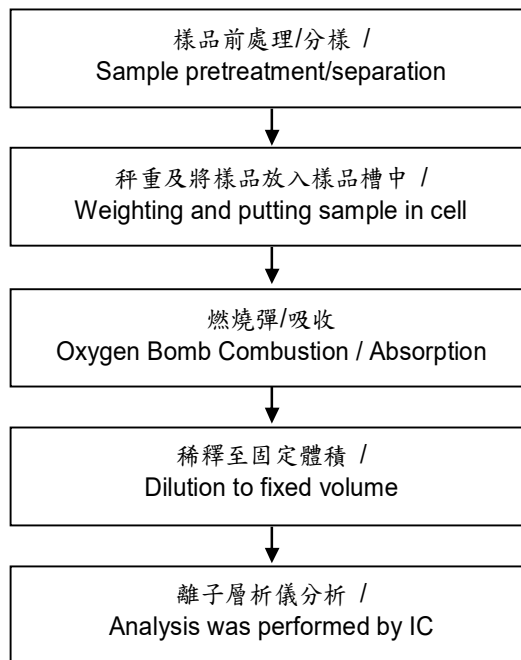
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鹵素分析流程圖 / Analytical flow chart - Halogen

- 測試人員：陳恩臻 / Technician: Rita Chen
- 測試負責人：張啟興 / Supervisor: Troy Chang



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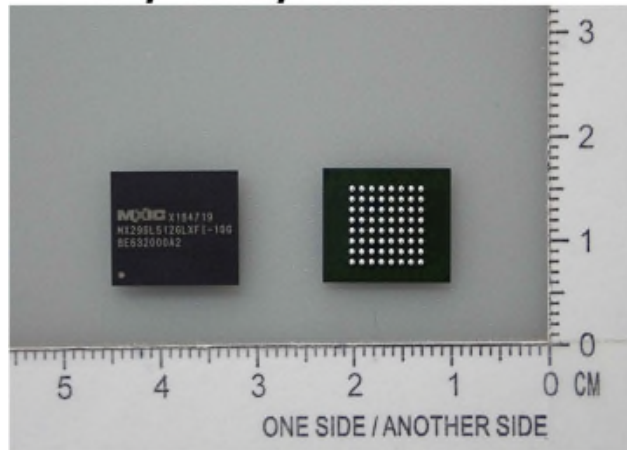
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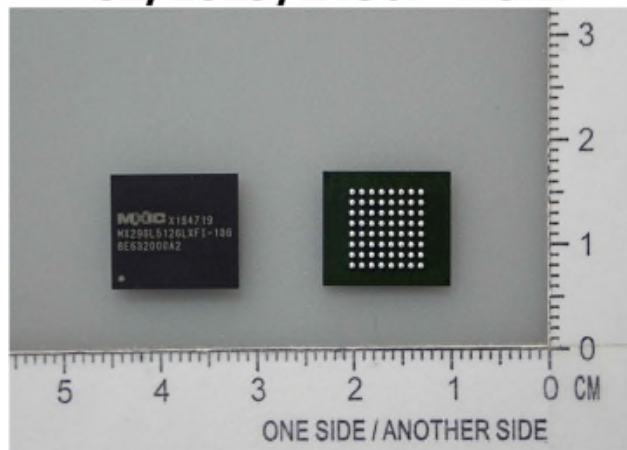
* 照片中如有箭頭標示，則表示為實際檢測之樣品/部位。*

(The tested sample / part is marked by an arrow if it's shown on the photo.)

CE/2019/24567 NO.1



CE/2019/24567 NO.2



** 報告結尾 (End of Report) **