



TEST REPORT

Lab No. : (6221)181-0248
Date : July 08, 2021
Page : 1 of 11

APPLICANT
申請人 : Jentech Precision Industrial Co., Ltd
No.40, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
: 健策精密工業股份有限公司
333 桃園市龜山區科技一路 40 號

CONTACT PERSON
聯絡人 : —

DATE OF SUBMISSION
送樣日期 : July 01, 2021
: 2021 年 07 月 01 日

PERFORMANCE PERIOD
測試日期 : July 01, 2021 to July 08, 2021
: 2021 年 07 月 01 日至 2021 年 07 月 08 日

SAMPLE DESCRIPTION
樣品描述 : HEAT SPREADER
: (STAMPED COPPER-BLACK OXIDE-BLACK EPOXY)

SUMMARY OF TEST RESULTS 測試結果摘要

TEST REQUESTED 測試要求	CONCLUSION 結論	REMARK 備註
Heavy Metals and Flame Retardants Content – European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) 重金屬和阻燃劑含量 – 有關歐盟委員會針對電子產品的指令 (電子電氣禁用某些有害物質指令), 2011/65/EU	PASS 通過	—
Phthalates Test – Directive (EU)2015/863 Amendment of European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) (Note: The amendment will be effective on 22 July 2019. For medical devices ,monitoring and control instruments, effective date will be 22 July 2021.) 鄰苯二甲酸鹽測試 – 指令 2011/65/EU 歐洲議會和理事會關於電子電氣設備中限制使用某些有害物質 (RoHS)的修正案指令 (EU)2015/863. (注釋:修正案將於 2019 年 7 月 22 日起生效。對於醫療設備及監測和控制設備生效日期為 2021 年 7 月 22 日)	PASS 通過	—
Halogenated compounds – F, Cl, Br & I 含鹵素物質檢測 – 氟, 氯, 溴 和 碘	DATA 數據	Test result in page 4 測試結果請見第 4 頁
Hexabromocyclododecane (HBCDD) 六溴環十二烷	DATA 數據	Test result in page 5 測試結果請見第 5 頁

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**BUREAU
VERITAS**

Lab No. : (6221)181-0248

Date : July 08, 2021

Page : 2 of 11

TEST REQUESTED 測試要求	CONCLUSION 結論	REMARK 備註
Antimony (Sb) Content 銻含量	DATA 數據	Test result in page 5 測試結果請見第 5 頁
Beryllium (Be) Content 鈹含量	DATA 數據	Test result in page 5 測試結果請見第 5 頁

REMARK

If there are questions or concerns on this report, please contact:
若有任何疑問或諮詢，請以 email 與我們聯絡

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VICO LIN
MANAGER
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**BUREAU
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Lab No. : (6221)181-0248

Date : July 08, 2021

Page : 3 of 11

TEST RESULT 測試結果

Tested item 測試部件	
1.	Black coated coppery metal / 黑色塗層銅色金屬

Heavy Metals and Flame Retardants Content – European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)

重金屬和阻燃劑含量 – 有關歐盟委員會針對電子產品的指令(電子電氣禁用某些有害物質指令)，2011/65/EU

Compounds 化合物	Unit 單位	Tested item 測試部件	MDL 測試方法 偵測極限	RoHS' Limits 限用有害物質指 令限值
		1		
Lead [Pb] / 鉛	mg/kg	N.D.	2	1000
Cadmium [Cd] / 鎘	mg/kg	N.D.	2	100
Mercury [Hg] / 汞	mg/kg	N.D.	2	1000
Chromium (VI) [Cr(VI)] / 六價鉻	µg/cm ²	N.D.	0.1	1000
Polybrominated Biphenyls(PBBs) / 多溴聯苯				
Bromobiphenyls / 一溴聯苯	mg/kg	N.D.	5	
Dibromobiphenyls / 二溴聯苯	mg/kg	N.D.	5	
Tribromobiphenyls / 三溴聯苯	mg/kg	N.D.	5	
Tetrabromobiphenyls / 四溴聯苯	mg/kg	N.D.	5	
Pentabromobiphenyls / 五溴聯苯	mg/kg	N.D.	5	
Hexabromobiphenyls / 六溴聯苯	mg/kg	N.D.	5	
Heptabromobiphenyls / 七溴聯苯	mg/kg	N.D.	5	
Octabromobiphenyls / 八溴聯苯	mg/kg	N.D.	5	
Nonabromobiphenyls / 九溴聯苯	mg/kg	N.D.	5	
Decabromobiphenyl / 十溴聯苯	mg/kg	N.D.	5	
Sum of PBBs / 多溴聯苯總和	mg/kg	N.D.	—	
Polybrominated Diphenyl Ethers(PBDEs) / 多溴聯苯醚				
Bromodiphenyl ethers / 一溴聯苯醚	mg/kg	N.D.	5	
Dibromodiphenyl ethers / 二溴聯苯醚	mg/kg	N.D.	5	
Tribromodiphenyl ethers / 三溴聯苯醚	mg/kg	N.D.	5	
Tetrabromodiphenyl ethers / 四溴聯苯醚	mg/kg	N.D.	5	
Pentabromodiphenyl ethers / 五溴聯苯醚	mg/kg	N.D.	5	
Hexabromodiphenyl ethers / 六溴聯苯醚	mg/kg	N.D.	5	
Heptabromodiphenyl ethers / 七溴聯苯醚	mg/kg	N.D.	5	
Octabromodiphenyl ethers / 八溴聯苯醚	mg/kg	N.D.	5	
Nonabromodiphenyl ethers / 九溴聯苯醚	mg/kg	N.D.	5	
Decabromodiphenyl ether / 十溴聯苯醚	mg/kg	N.D.	5	
Sum of PBDEs / 多溴聯苯醚總和	mg/kg	N.D.	—	
Conclusion 結論	—	PASS 通過	—	—



**BUREAU
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Lab No. : (6221)181-0248

Date : July 08, 2021

Page : 4 of 11

TEST RESULT 測試結果

Phthalates Test – Directive (EU)2015/863 Amendment of European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)

鄰苯二甲酸鹽測試 – 指令 2011/65/EU 歐洲議會和理事會關於電子電氣設備中限制使用某些有害物質 (RoHS) 的修正案指令(EU)2015/863.

Test Parameter 測試項目	CAS No. CAS 編號	Unit 單位	Tested item 測試部件	MDL 測試方法 偵測極限	Maximum Allowable Limit 最大允許限值
			1		
Dibutyl phthalate (DBP) 鄰苯二甲酸二丁酯	84-74-2	mg/kg	N.D.	50	1000
Butyl benzyl phthalate (BBP) 鄰苯二甲酸丁苄酯	85-68-7	mg/kg	N.D.	50	1000
Bis(2-ethylhexyl) phthalate (DEHP) 鄰苯二甲酸二異辛酯	117-81-7	mg/kg	N.D.	50	1000
Diisobutyl phthalate (DIBP) 鄰苯二甲酸二異丁酯	84-69-5	mg/kg	N.D.	50	1000
Conclusion 結論	—	—	PASS 通過	—	—

Halogen Content - Fluorine, Chlorine, Bromine and Iodine

鹵素含量 – 氟、氯、溴和碘

Compounds 化合物	Unit 單位	Tested item 測試部件	MDL 測試方法 偵測極限
		1	
Halogenated Compounds / 鹵素:			
Fluorine [F] / 氟	mg/kg	N.D.	50
Chlorine [Cl] / 氯	mg/kg	N.D.	50
Bromine [Br] / 溴	mg/kg	N.D.	50
Iodine [I] / 碘	mg/kg	N.D.	50
Sum of Halogenated Compounds / 鹵素總和	mg/kg	N.D.	50

TEST RESULT 測試結果

Hexabromocyclododecane (HBCDD)

六溴環十二烷

Test Parameter 測試項目	Unit 單位	Tested item 測試部件	MDL 測試方法 偵測極限
		1	
Hexabromocyclododecane (HBCDD) 六溴環十二烷	mg/kg	N.D.	5

Antimony (Sb) Content

銻含量

Test Parameter 測試項目	Unit 單位	Tested Item 測試部件	MDL 測試方法 偵測極限
		1	
Antimony (Sb) Content 銻含量	mg/kg	N.D.	10

Beryllium (Be) Content

鈹含量

Test Parameter 測試項目	Unit 單位	Tested Item 測試部件	MDL 測試方法 偵測極限
		1	
Beryllium (Be) Content 鈹含量	mg/kg	N.D.	10

Note 註解:

N.D. = Not Detected (低於偵測極限) - = Empty (空白)

mg/kg = milligram per kilogram = ppm (毫克/公斤, 百萬分之一)

MDL = Method Detection Limit (測試方法偵測極限)



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Lab No. : (6221)181-0248

Date : July 08, 2021

Page : 6 of 11

Test Parameter 測試項目	Test Method 測試方法
Lead [Pb] / 鉛	With reference to IEC 62321-5: 2013.
Cadmium [Cd] / 鎘	參照 IEC 62321-5: 2013.
Mercury [Hg] / 汞	With reference to IEC 62321-4: 2013+AMD 1:2017 CSV. 參照 IEC 62321-4: 2013+AMD 1:2017 合併版本.
Chromium (VI) [Cr(VI)] / 六價鉻	Metal 金屬: With reference to IEC 62321-7-1:2015. ^[a] 參照 IEC 62321-7-1:2015. ^[a]
Polybrominated Biphenyls [PBBs] and Polybrominated Diphenyl Ethers [PBDEs] / 多溴聯苯和多溴聯苯醚	With reference to IEC 62321-6: 2015. 參照 IEC 62321-6: 2015.
Dibutyl phthalate (DBP), Butyl benzyl phthalate (BBP), Bis(2-ethylhexyl) phthalate (DEHP), Diisobutyl phthalate (DIBP) / 鄰苯二甲酸二丁酯, 鄰苯二甲酸丁苄酯, 鄰苯二甲酸二異辛酯, 鄰苯二甲酸二異丁酯	With reference to IEC 62321-8: 2017. 參照 IEC 62321-8: 2017.
Halogenated Compounds: F, Cl, Br, I / 鹵素: 氟, 氯, 溴, 碘	With reference to EN14582:2016(E). 參照 EN14582:2016(E).
Hexabromocyclododecane (HBCDD) / 六溴環十二烷	With reference to US EPA 3540C & IEC 62321-6 extracted with organic solvent and then analysed by Liquid Chromatograph Mass Spectrometer. 參照 US EPA 3540C 和 IEC 62321-6 以有機溶劑萃取, 液相層析質譜儀分析 (LC-MS).
Antimony (Sb) Content / 銻含量	With reference to U.S. EPA 3050B. 參照 U.S. EPA 3050B.
Beryllium (Be) Content / 鈹含量	With reference to U.S. EPA 3050B. 參照 U.S. EPA 3050B.
[a]	The principle of this method was evaluated and supported by two studies organized by IEC TC 111 WG3. These studies were focused on detecting the presence of Cr VI in the corrosion protection coatings on metallic samples. 該方法的原理是在由 IEC TC111 WG3 組織的兩次研究中得到充分評估並獲得了認可。這些研究著重於對金屬樣品上的防腐塗層中六價鉻的存在檢測(定性測試)

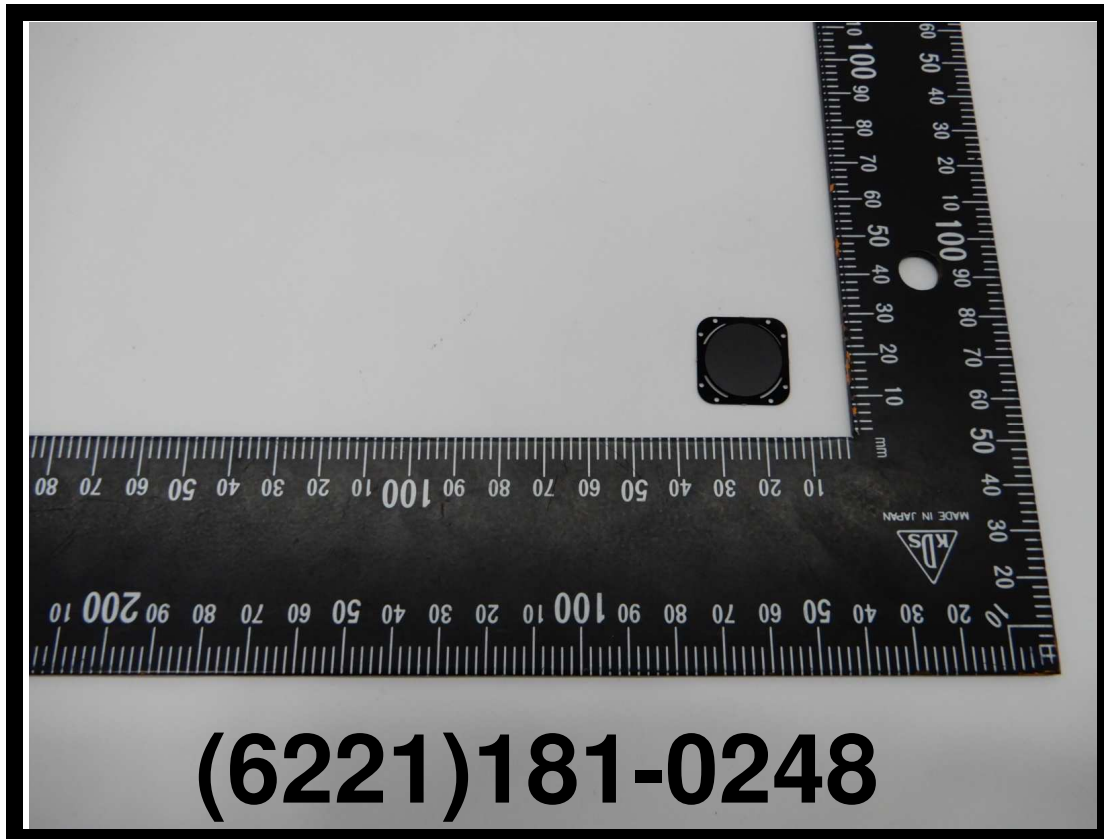
Remark 備註:

- The result only relates to the tested item. The report shall not be reproduced except full without the written approval of the testing laboratory. Parameters which are not covered by the lab's testing scope are subcontracted to laboratories with government approval. The accreditation relates to competences given in the accreditation certificate.
測試結果僅代表經測試部件。本報告未經測試實驗室認可不得複製。未在本實驗室測試範圍之測試均委外至經官方核可之實驗室。委外實驗室之能力經認證許可。
- Samples test were conducted as per applicant's request.
樣品測試進行為依照申請人的要求。

- End 結束 -

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Photo of the Submitted Sample
委送樣品照片



Sample



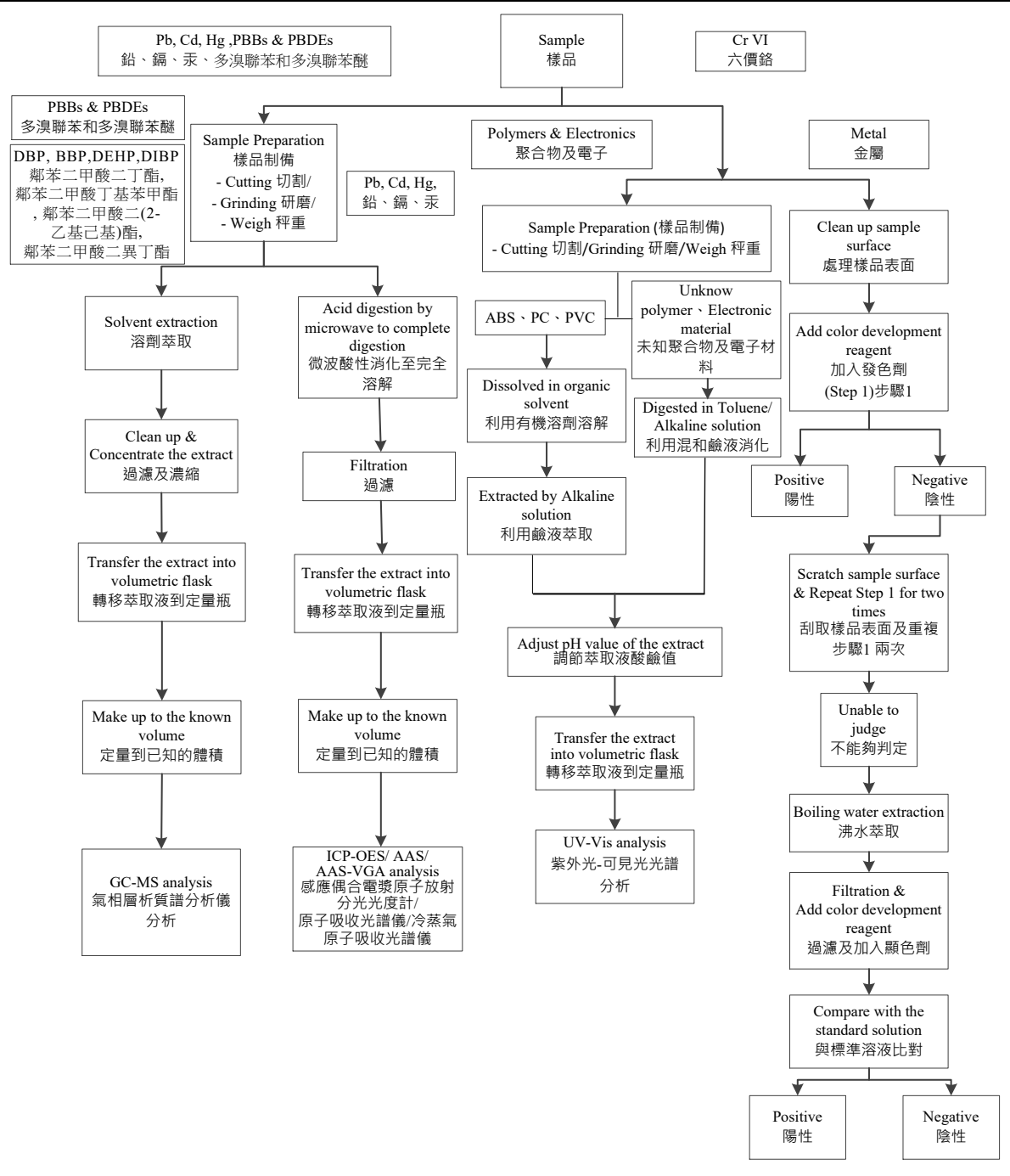
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APPENDIX(附錄)

Test Flowchart of Heavy Metals, Flame Retardants and Phthalates Content [European Council Directive 2011/65/EU]:

重金屬,阻燃劑及鄰苯二甲酸酯類的測試流程圖 歐盟委員會指令 2011/65/EU:

- 1. 測試人員：吳毓嫻, 梁維翰 / Name of the person who made measurement: Maggie Wu, Ben Liang
2. 測試負責人：林晏瑜, 黃秉宏 / Name of the person in charge of measurement: Vico Lin, Jerry Huang



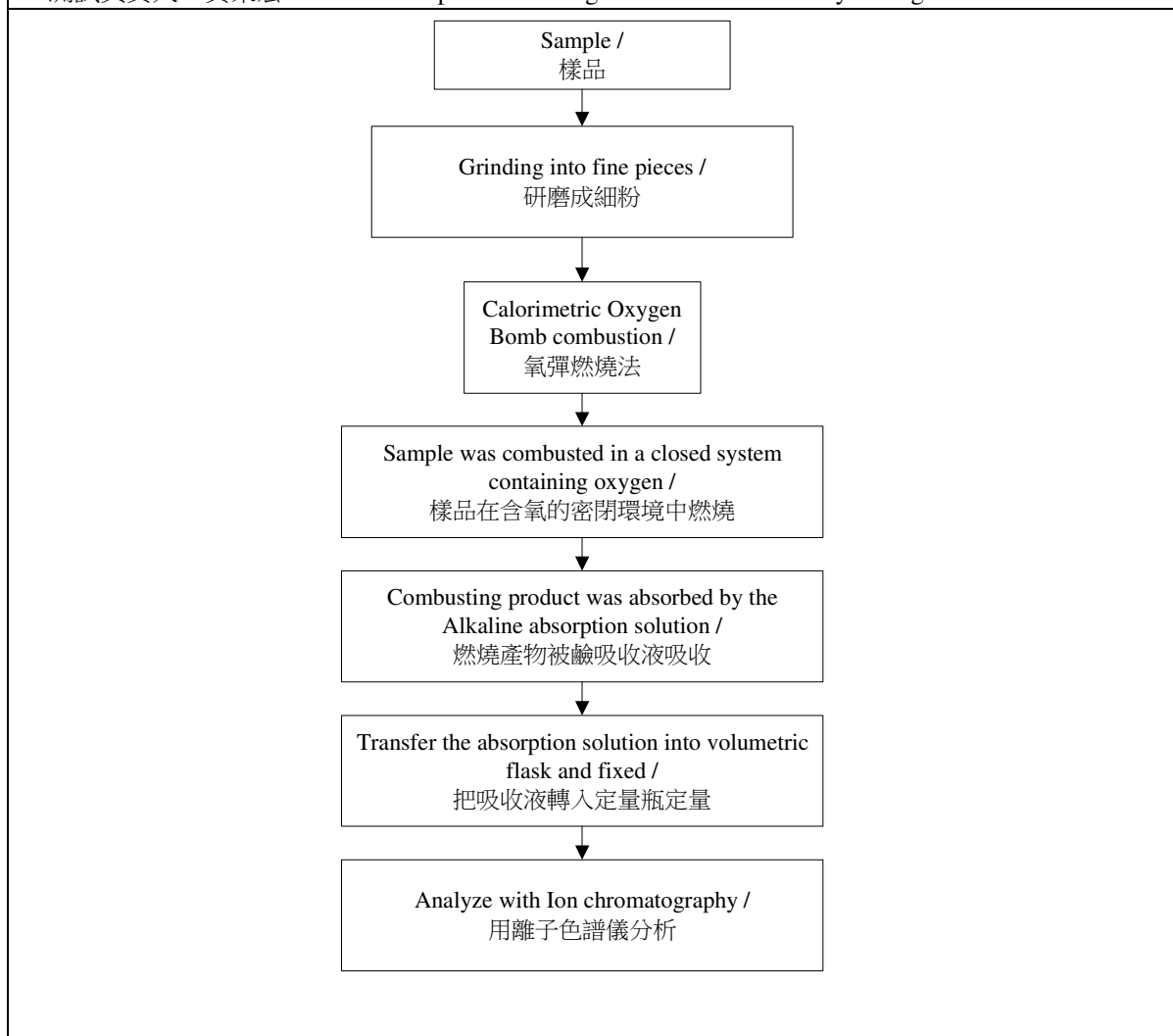
APPENDIX(附錄)

Test Flowchart of Halogenated Compounds: F, Cl, Br, I:

鹵素: 氟, 氯, 溴, 碘的測試流程圖:

1. 測試人員: 謝明桓 / Name of the person who made measurement: Henry Hsieh

2. 測試負責人: 黃秉宏 / Name of the person in charge of measurement: Jerry Huang

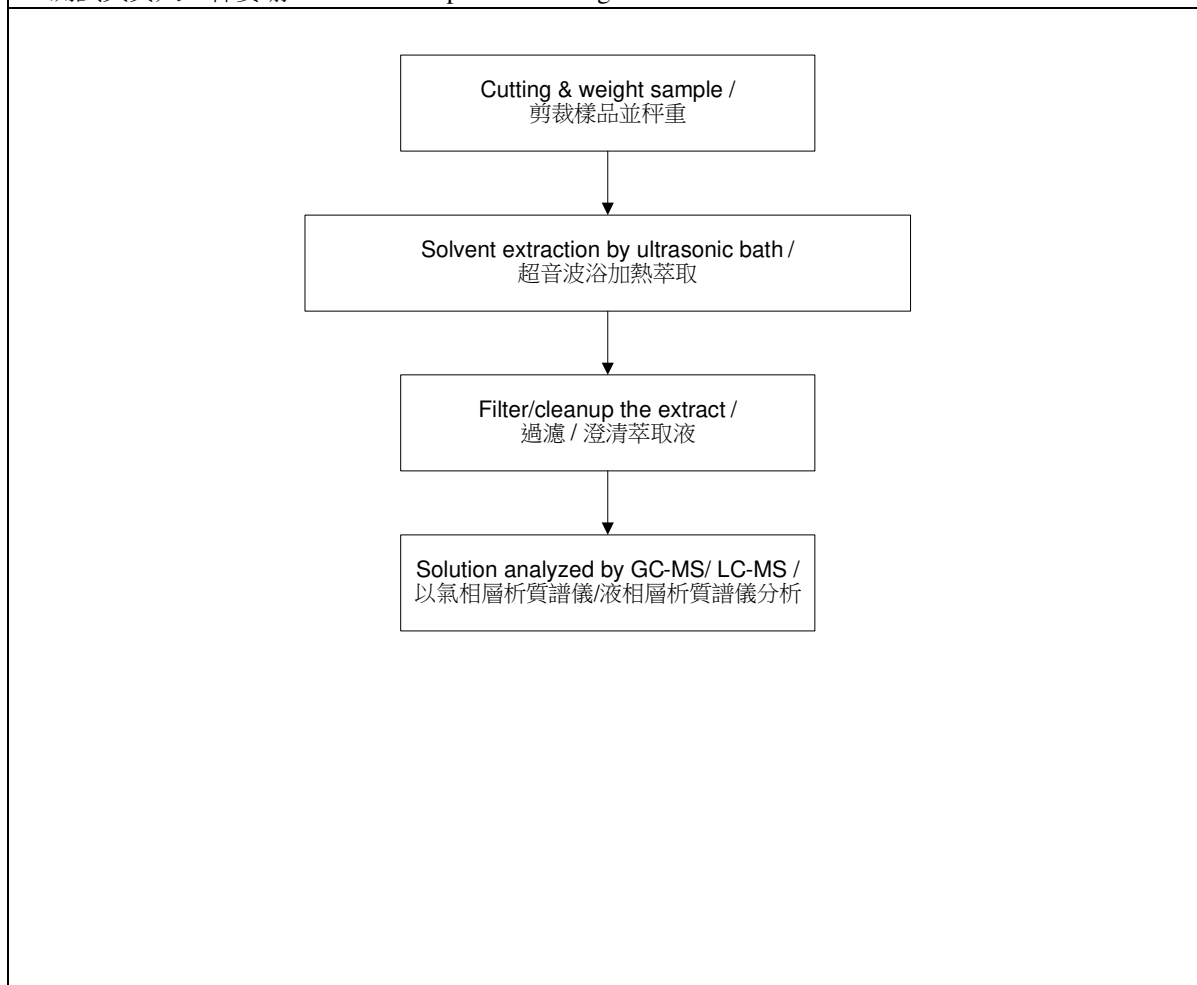


APPENDIX(附錄)

Test Flowchart of Hexabromocyclododecane (HBCDD):

六溴環十二烷的測試流程圖:

1. 測試人員：宋文峯 / Name of the person who made measurement: Klaus Sung
2. 測試負責人：林晏瑜 / Name of the person in charge of measurement: Vico Lin



APPENDIX(附錄)

Test Flowchart of Antimony (Sb) Content and Beryllium (Be) Content:

銻含量與鉍含量的測試流程圖:

1. 測試人員：梁維翰 / Name of the person who made measurement: Ben Liang
2. 測試負責人：黃秉宏 / Name of the person in charge of measurement: Jerry Huang

