

測試報告

Test Report

號碼(No.): ETA22A00042

日期(Date): 17-Oct-2022

頁數(Page): 1 of 20

ISOLA GROUP

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):

樣品名稱(Sample Name) : PREPREG 樣品型號(Style/Item No.) : FR408HR

收件日(Sample Receiving Date)

05-Oct-2022

測試期間(Testing Period)

: 05-Oct-2022 to 17-Oct-2022

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).) 請參閱下一頁 (Please refer to following pages.)

測試結果(Test Results) :

結 論(Conclusion) :

(1) 根據客戶所提供的樣品,其編、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.)

Troy Chang / Department Malager Signed for and on behalf of SGS TAIWAN LTD.
Chemical Laboratory - Taipei



PIN CODE: 5F547FE8



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測試部位敘述 (Test Part Description)

No.1 : 黃色片狀 (YELLOW SHEET)

測試結果 (Test Results)

測試項目	測試方法	單位	MDL	結果	限值
(Test Items)	(Method)	(Unit)		(Result)	(Limit)
				No.1	
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-	參考IEC 62321-5: 2013,以感應耦合電漿	mg/kg	2	n.d.	100
43-9)	發射光譜儀分析。(With reference to IEC				
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439-92-1)		mg/kg	2	4.72	1000
	by ICP-OES.)				
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-	參考IEC 62321-4: 2013+ AMD1: 2017	mg/kg	2	n.d.	1000
97-6)	以感應耦合電漿發射光譜儀分析。(With				
	reference to IEC 62321-4: 2013+ AMD1:				
	2017, analysis was performed by ICP-				
	OES.)				
六價鉻 (Hexavalent Chromium) Cr(VI)	參考IEC 62321-5: 2013, IEC 62321-7-2:	mg/kg	8	n.d.	1000
(CAS No.: 18540-29-9) (◆)	2017,以感應耦合電漿發射光譜儀、紫外				
	光-可見光分光光度計分析。(With				
	reference to IEC 62321-5: 2013, IEC				
	62321-7-2: 2017, analysis was				
〉白 1994 サ / M A o o o lo u o o o o lo i o lo o o o	performed by ICP-OES, UV-VIS.)				
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)	參考IEC 62321-6: 2015,以氣相層析儀/質	mg/kg	5	n.d.	-
五溴聯苯 (Pentabromobiphenyl)	譜儀分析。(With reference to IEC 62321-	mg/kg	5	n.d.	-
六溴聯苯 (Hexabromobiphenyl)	6: 2015, analysis was performed by	mg/kg	5	n.d.	-
七溴聯苯 (Heptabromobiphenyl)	GC/MS.)	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	5	n.d.	-
多溴聯苯總和 (Sum of PBBs)		mg/kg	-	n.d.	1000



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測試項目	測試方法	單位	MDL	結果	限值
(Test Items)	(Method)	(Unit)		(Result)	(Limit)
(rest items)	(Method)	(Offic)		No.1	(2
一溴聯苯醚 (Monobromodiphenyl ether)		mg/kg	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)	# */IFC C2221 C 2015 N/E-17E-1/ /E//	mg/kg	5	n.d.	-
五溴聯苯醚 (Pentabromodiphenyl ether)	参考IEC 62321-6: 2015 · 以氣相層析儀/質	mg/kg	5	n.d.	-
六溴聯苯醚 (Hexabromodiphenyl ether)	譜儀分析。(With reference to IEC 62321-	mg/kg	5	n.d.	-
七溴聯苯醚 (Heptabromodiphenyl ether)	6: 2015, analysis was performed by GC/MS.)	mg/kg	5	n.d.	
八溴聯苯醚 (Octabromodiphenyl ether)	GC/M3.)	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 benzyl		mg/kg	50	n.d.	1000
phthalate (BBP)) (CAS No.: 85-68-7)					i
鄰苯二甲酸二丁酯 (DBP) (Dibutyl		mg/kg	50	n.d.	1000
phthalate (DBP)) (CAS No.: 84-74-2)					i
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-		mg/kg	50	n.d.	1000
(2-ethylhexyl) phthalate (DEHP)) (CAS					i
No.: 117-81-7)	┃ ●参考IEC 62321-8: 2017·以氣相層析儀/質				
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl	iii 儀分析。(With reference to IEC 62321-	mg/kg	50	n.d.	1000
phthalate (DIBP)) (CAS No.: 84-69-5)	8: 2017, analysis was performed by				
鄰苯二甲酸二異癸酯 (DIDP) (Diisodecyl	GC/MS.)	mg/kg	50	n.d.	-
phthalate (DIDP)) (CAS No.: 26761-40-					i
0, 68515-49-1)					
鄰苯二甲酸二異壬酯 (DINP) (Diisononyl		mg/kg	50	n.d.	_
phthalate (DINP)) (CAS No.: 28553-12-					ı
0, 68515-48-0)					
鄰苯二甲酸二正辛酯 (DNOP) (Di-n-octyl		mg/kg	50	n.d.	-
phthalate (DNOP)) (CAS No.: 117-84-0)					



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測試項目	測試方法	單位	MDL	結果	限值
(Test Items)	(Method)	華血 (Unit)	IVIDE	(Result)	(Limit)
(rest items)	(Wethou)	(OIIIt)		No.1	(Lillie)
	 参考IEC 62321: 2008・以氣相層析儀/質譜	mg/kg	5	n.d.	
(HBCDD) (α - HBCDD, β - HBCDD, γ - HBCDD)		1119/109	3	11.0.	
(Hexabromocyclododecane (HBCDD) and	2008, analysis was performed by				
all major diastereoisomers identified (α-	GC/MS.)				
HBCDD, β- HBCDD, γ- HBCDD)) (CAS No.:					
25637-99-4, 3194-55-6 (134237-51-7,					
134237-50-6, 134237-52-8))					
氟 (F) (Fluorine (F)) (CAS No.: 14762-94-		mg/kg	50	567	-
8)	A +4				
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-	參考BS EN 14582: 2016 · 以離子層析儀分	mg/kg	50	251	-
15-1)	析。(With reference to BS EN 14582:			0.1=00	
溴 (Br) (Bromine (Br)) (CAS No.: 10097-	2016, analysis was performed by IC.)	mg/kg	50	94700	-
32-2)					
碘 (I) (Iodine (I)) (CAS No.: 14362-44-8)	A + ()	mg/kg	50	n.d.	-
全氟辛烷磺酸及其鹽類 (PFOS and its	參考US EPA 3550C: 2007 · 以液相層析串	mg/kg	10	n.d.	-
salts) (CAS No.: 1763-23-1 and its salts)	聯質譜儀分析。(With reference to US				
	EPA 3550C: 2007, analysis was				
入与 · · · · · · · · · · · · · · · · · · ·	performed by LC/MS/MS.)		10		
全氟辛酸及其鹽類 (PFOA and its salts)	参考US EPA 3550C: 2007・以液相層析串	mg/kg	10	n.d.	-
(CAS No.: 335-67-1 and its salts)	聯質譜儀分析。(With reference to US				
	EPA 3550C: 2007, analysis was performed by LC/MS/MS.)				
	参考RSTS-E&E-121·以液相層析儀/質譜	ma/ka	10	52400	
(Tetrabromobisphenol A (TBBP-A))	参考K313-EQE-121 · 以放伯層/ II 展/真晶 儀分析。(With reference to RSTS-E&E-	mg/kg	10	32400	-
(CAS No.: 79-94-7)	121, analysis was performed by LC/MS.)				
· ·			1		
雙酚A (Bisphenol A) (CAS No.: 80-05-7)	参考RSTS-CHEM-239-1・以液相層析串聯	mg/kg	1	n.d.	-
	質譜儀分析。(With reference to RSTS-				
	CHEM-239-1, analysis was performed by LC/MS/MS.)				
有機與 (Organic tip compounds)	LC/1V13/1V13.)				
有機錫 (Organic-tin compounds) 三丁基錫 (TBT) (Tributyl tin (TBT))	参考ISO 17353: 2004 · 以氣相層析儀/火	mg/kg	0.03	n.d.	_
三丁基爾 (TBT) (Tributy) till (TBT)) 三苯基錫 (TPT) (Triphenyl tin (TPT))	多名ISO 17333. 2004,以照相層別議/大 焰光度偵測器分析。(With reference to	mg/kg	0.03	n.d.	
二丁基錫 (DBT) (Dibutyl tin (DBT))	ISO 17353: 2004, analysis was	mg/kg	0.03	n.d.	
二字基錫 (DOT) (Dioctyl tin (DOT))	performed by GC/FPD.)	mg/kg	0.03	n.d.	
_ 十	periorined by definib.	mg/kg	0.03	n.u.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result) No.1	限值 (Limit)
氧化雙三丁基錫 (TBTO) (Bis(tributyltin) oxide (TBTO)) (CAS No.: 56-35-9)	由三丁基錫測試結果計算得之。 (Calculated from the result of Tributyl Tin (TBT).)	mg/kg	0.03 🛦	n.d.	-
聚氯乙烯 (Polyvinyl chloride) (PVC)	參考ASTM E1252: 2013·以傅立葉轉換紅外線光譜儀及焰色法分析。(With reference to ASTM E1252: 2013, analysis was performed by FT-IR and Flame Test.)	**	1	Negative	-
砷 (As) (Arsenic (As)) (CAS No.: 7440-38-2)	參考US EPA 3052: 1996.以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	-
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)	參考US EPA 3052: 1996.以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	-
鎳 (Ni) (Nickel (Ni)) (CAS No.: 7440-02- 0)	參考US EPA 3052: 1996.以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.)	mg/kg	2	4.34	-
磷 (P) (Phosphorus (P)) (CAS No.: 7723-14-0)	參考US EPA 3052: 1996.以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.)	mg/kg	2	105	-
銻 (Sb) (Antimony (Sb)) (CAS No.: 7440-36-0)	參考US EPA 3052: 1996.以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	-
錫 (Sn) (Tin (Sn)) (CAS No.: 7440-31-5)	參考US EPA 3052: 1996.以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result) No.1	限值 (Limit)
總揮發性有機物質 (Total Volatile Organic Compounds (TVOC))	以頂空氣體進樣裝置·連接氣相層析儀/質 譜儀檢測。(Analysis was performed by Headspace linked GC/MS.)(測試條件 / Test Condition: 90°C, 30 mins)	µg/g	1	n.d.	-

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. **= Qualitative analysis (No Unit) 定性分析(無單位)
- 6. Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
- 7. 全氟辛烷磺酸及其鹽類包含等物質 (PFOS and its salts including):

CAS No.: 1763-23-1, 2795-39-3, 29457-72-5, 29081-56-9, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7, 91036-71-4, 4021-47-0 and others.

- 8. 全氟辛酸及其鹽類包含等物質 (PFOA and its salts including):
 - CAS No.: 335-67-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0, 3825-26-1 and others.
- 9. (*)

若鉻含量小於六價鉻之方法偵測極限值,則六價鉻為n.d.,不須再測試六價鉻。

The result of Cr(VI) is "n.d." as the result of Chromium (Cr) is less than the MDL of Cr(VI), and confirmation test of Cr(VI) is not required.

若鉻含量未小於六價鉻之方法偵測極限值,需進行六價鉻測試。

If the Chromium (Cr) content is not less than the MDL of Cr(VI), confirmation test of Cr(VI) is required.



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10. ▲: MDL是針對元素/測試化合物之評估。(The MDL was evaluated for element / tested substance.) 換算公式 (Conversion Formula): AX = A × F

35 (3) 2(10) (30)	· · · · · · · · · · · · · · · · · · ·		
AX	Α	F	
氧化雙三丁基錫	一丁甘钯 (Tributul Tip) (TDT)	1 0276	
(Bis(tributyltin)oxide) (TBTO)	三丁基錫 (Tributyl Tin) (TBT)	1.0276	

參數換算表 (Parameter Conversion Table):

https://eecloud.sgs.com/Region_TW/DocDownload.aspx#otherDoc

11. 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.)



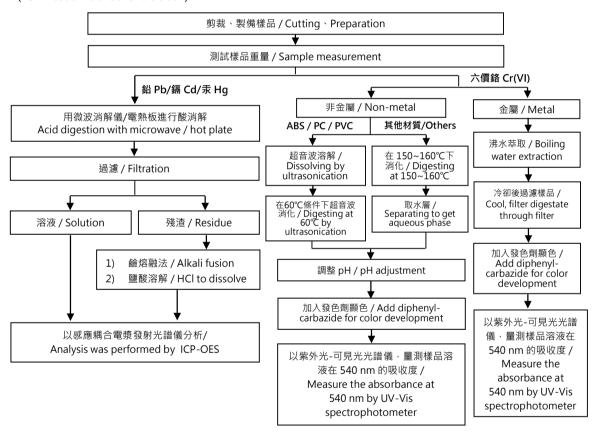
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重金屬流程圖 / Analytical flow chart of heavy metal

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. (Cr^{6+} test method excluded)

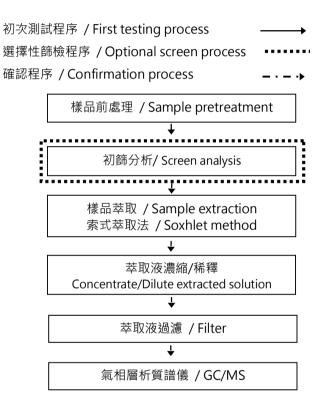




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多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBBs/PBDEs





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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】

樣品前處理/分樣 / Sample pretreatment/separation

樣品以 THF 四氫呋喃溶解萃取 / Sample dissolved/extracted by THF

萃取液稀釋 / Dilute extracted solution

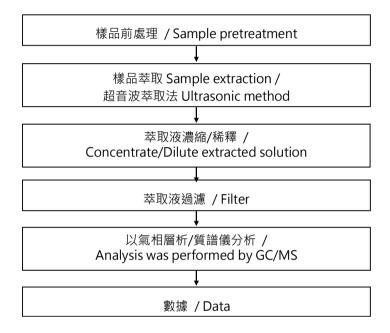
氣相層析質譜儀分析 / Analysis was performed by GC/MS



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





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

樣品前處理/分樣 / Sample pretreatment / Separation

平重及將樣品放入樣品槽中 / Weighting and putting sample in cell

燃燒彈/吸收 / Oxygen bomb combustion / Absorption

稀釋至固定體積 / Dilution to fixed volume

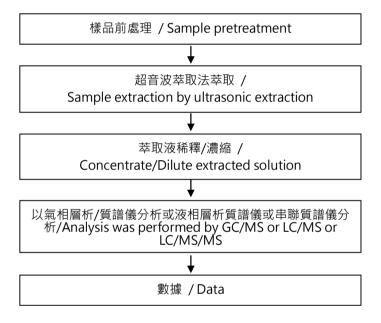
以離子層析儀分析 / Analysis was performed by IC



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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.)

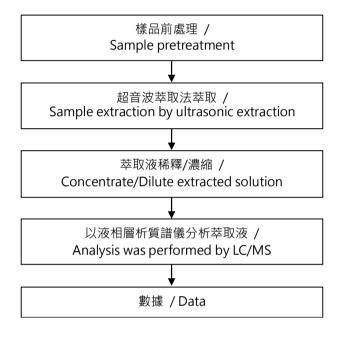




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四溴雙酚-A 分析流程圖 / Analytical flow chart - TBBP-A

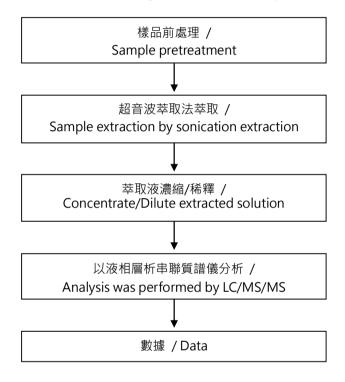




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雙酚A分析流程圖 / Analytical flow chart - Bisphenol A

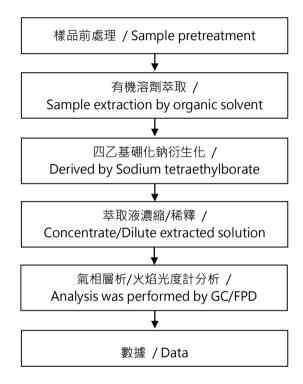




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有機錫分析流程圖 / Analytical flow chart - Organic-Tin



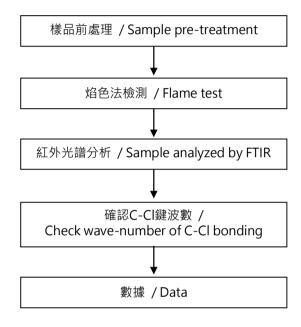


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聚氯乙烯物質判定分析流程圖 / Analysis flow chart - PVC





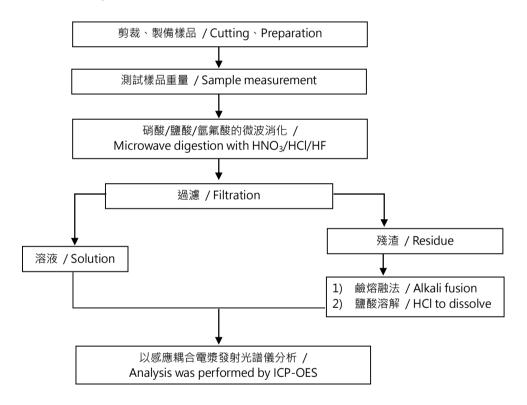
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元素(含重金屬)分析流程圖 / Analytical flow chart of elements (Heavy metal included)

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. 【参考方法/Reference method: US EPA 3051A、US EPA 3052】



* US EPA 3051A 方法未添加氫氟酸 / US EPA 3051A method does not add HF.

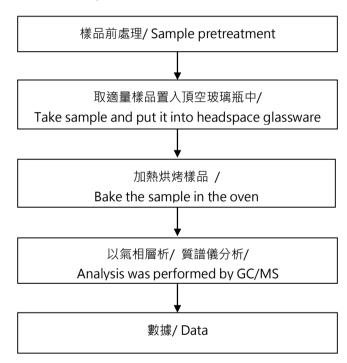


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揮發性有機化合物分析流程圖/ Analytical flow chart of volatile organic compounds (VOCs)

【參考方法/ Reference method: US EPA 5021A】





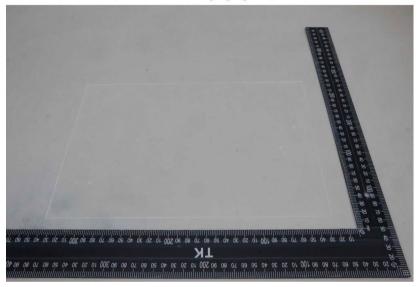
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* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. * (The tested sample / part is marked by an arrow if it's shown on the photo.)

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** 報告結尾 (End of Report) **