

測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 1 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

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) : 優美科薄膜材料股份有限公司 (UMICORE THIN FILM PRODUCTS TAIWAN CO., LTD.)

樣品名稱(Sample Name) : Ti 4N5

收件日(Sample Receiving Date) : 07-Jan-2021

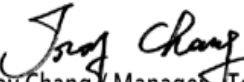
測試期間(Testing Period) : 07-Jan-2021 to 18-Jan-2021

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，其鎘、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, Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei



PIN CODE: 9D279B07

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 2 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試部位敘述 (Test Part Description)

No.1 : 銀色金屬 (SILVER COLORED METAL)

測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	參考IEC 62321-5: 2013 · 以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	100
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439-92-1)	參考IEC 62321-5: 2013 · 以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	1000
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	參考IEC 62321-4: 2013+ AMD1: 2017 · 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.)	mg/kg	2	n.d.	1000
六價鉻 (Hexavalent Chromium) Cr(VI) (CAS No.: 18540-29-9) (#2)	參考IEC 62321-7-1: 2015 · 以紫外光-可見光分光光度計分析。(With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.)	µg/cm ²	0.1	n.d.	-
一溴聯苯 (Monobromobiphenyl)	參考IEC 62321-6: 2015 · 以氣相層析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.)	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	5	n.d.	-
多溴聯苯總和 (Sum of PBBs)		mg/kg	-	n.d.	1000

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 3 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

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				No.1	
一溴聯苯醚 (Monobromodiphenyl ether)	參考IEC 62321-6: 2015 · 以氣相層析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.)	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)		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.	-
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 phthalate (BBP)) (CAS No.: 85-68-7)	參考IEC 62321-8: 2017 · 以氣相層析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.)	mg/kg	50	n.d.	1000
鄰苯二甲酸二丁酯 (DBP) (Dibutyl phthalate (DBP)) (CAS No.: 84-74-2)		mg/kg	50	n.d.	1000
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-(2-ethylhexyl) phthalate (DEHP)) (CAS No.: 117-81-7)		mg/kg	50	n.d.	1000
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP)) (CAS No.: 84-69-5)		mg/kg	50	n.d.	1000
六溴環十二烷及所有主要被辨別出的異構物(HBCDD) (α- HBCDD, β- HBCDD, γ- HBCDD) (Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD)) (CAS No.: 25637-99-4, 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))	參考IEC 62321: 2008 · 以氣相層析儀/質譜儀分析。(With reference to IEC 62321: 2008, analysis was performed by GC/MS.)	mg/kg	5	n.d.	-

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 4 of 29

UMICORE THIN FILM PRODUCTS AG.

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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
氟 (F) (Fluorine (F)) (CAS No.: 14762-94-8)	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.)	mg/kg	50	n.d.	-
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-15-1)		mg/kg	50	n.d.	-
溴 (Br) (Bromine (Br)) (CAS No.: 10097-32-2)		mg/kg	50	n.d.	-
碘 (I) (Iodine (I)) (CAS No.: 14362-44-8)		mg/kg	50	n.d.	-
全氟辛烷磺酸及其鹽類 (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	參考CEN/TS 15968: 2010 · 以液相層析串聯質譜儀分析。(With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.)	mg/kg	0.01	n.d.	-
全氟辛酸及其鹽類 (PFOA and its salts) (CAS No.: 335-67-1 and its salts)		mg/kg	0.01	n.d.	-
多氯聯苯 (PCBs) (Polychlorinated biphenyls (PCBs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5	n.d.	-
多氯萘 (PCNs) (Polychlorinated naphthalene (PCNs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	5	n.d.	-
多氯三聯苯 (PCTs) (Polychlorinated terphenyls (PCTs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5	n.d.	-
短鏈氯化石蠟(C10-C13) (SCCP) (Short Chain Chlorinated Paraffins(C10-C13) (SCCP)) (CAS No.: 85535-84-8)	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	50	n.d.	-
三丁基錫 (TBT) (Tributyl tin (TBT))	參考ISO 17353: 2004 · 以氣相層析儀/火焰光度偵測器分析。(With reference to ISO 17353: 2004, analysis was performed by GC/FPD.)	mg/kg	0.03	n.d.	-
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.	-

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 5 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
三苯基錫 (TPhT) (Triphenyl tin (TPhT))	參考ISO 17353: 2004 · 以氣相層析儀/火焰光度偵測器分析。(With reference to ISO 17353: 2004, analysis was performed by GC/FPD.)	mg/kg	0.03	n.d.	-
二丁基錫 (DBT) (Dibutyl tin (DBT))	參考ISO 17353: 2004 · 以氣相層析儀/火焰光度偵測器分析。(With reference to ISO 17353: 2004, analysis was performed by GC/FPD.)	mg/kg	0.03	n.d.	-
二辛基錫 (DOT) (Diocetyl tin (DOT))	參考ISO 17353: 2004 · 以氣相層析儀/火焰光度偵測器分析。(With reference to ISO 17353: 2004, analysis was performed by GC/FPD.)	mg/kg	0.03	n.d.	-
偶氮 (AZO)					
2,4,5-三甲苯胺 (2,4,5-trimethylaniline) (CAS No.: 137-17-7)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
2,4-二氨基苯甲醚 (2,4-diaminoanisole) (CAS No.: 615-05-4)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
2,4-甲苯二胺 (2,4-diaminotoluene) (CAS No.: 95-80-7)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
2,4-二甲基苯胺 (2,4-xylidine) (CAS No.: 95-68-1)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
2,6-二甲基苯胺 (2,6-xylidine) (CAS No.: 87-62-7)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-

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日期(Date): 18-Jan-2021

頁數(Page): 6 of 29

UMICORE THIN FILM PRODUCTS AG.

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				No.1	
2-萘胺 (2-naphthylamine) (CAS No.: 91-59-8)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
3,3'-二氯聯苯胺 (3,3'-dichlorobenzidine) (CAS No.: 91-94-1)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
3,3'-二甲氧基聯苯胺 (3,3'-dimethoxybenzidine) (CAS No.: 119-90-4)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
3,3'-二甲基-4,4'-二胺基二苯甲烷 (3,3'-dimethyl-4,4'-diaminodiphenylmethane) (CAS No.: 838-88-0)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
3,3'-二甲基聯苯胺 (3,3'-dimethylbenzidine) (CAS No.: 119-93-7)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
4,4'-二胺基二苯甲烷 (4,4'-diaminodiphenylmethane (MDA)) (CAS No.: 101-77-9)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
4,4'-亞甲雙(2-氯苯胺) (4,4'-methylene-bis-(2-chloroaniline)) (CAS No.: 101-14-4)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
4,4'-二胺基二苯醚 (4,4'-oxydianiline) (CAS No.: 101-80-4)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-

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頁數(Page): 7 of 29

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				No.1	
4,4'-硫二苯胺 (4,4'-thiodianiline) (CAS No.: 139-65-1)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
4-苯基偶氮基苯胺 (4-aminoazobenzene) (CAS No.: 60-09-3)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
4-氨基二苯 (4-aminodiphenyl) (CAS No.: 92-67-1)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
4-氯苯胺 (4-chloroaniline) (CAS No.: 106-47-8)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
4-氯鄰甲苯胺 (4-chloro-o-toluidine) (CAS No.: 95-69-2)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
2-甲氧基-5-甲基苯胺 (2-methoxy-5-methylaniline) (CAS No.: 120-71-8)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
2-胺基-4-硝基甲苯 (5-nitro-o-toluidine) (CAS No.: 99-55-8)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
聯苯胺 (Benzidine) (CAS No.: 92-87-5)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 8 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
鄰-胺基偶氮甲苯 (o-aminoazotoluene) (CAS No.: 97-56-3)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/ 質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
鄰-甲氧基苯胺 (o-anisidine) (CAS No.: 90-04-0)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/ 質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	n.d.	-
鄰-甲苯胺 (o-toluidine) (CAS No.: 95- 53-4)	參考LFGB 82.02-2: 2013 · 以氣相層析儀/ 質譜儀分析。(With reference to LFGB 82.02-2: 2013, analysis was performed by GC/MS.)	mg/kg	3	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.)	**	-	Negative	-
石棉 (Asbestos)					
陽起石綿 (Actinolite) (CAS No.: 77536- 66-4)	參考EPA 600/R-93/116: 1993 · 以立體顯 微鏡(SM)與分散染色式偏光顯微鏡(DS- PLM)及X光繞射光譜分析法(XRD)分析。 (With reference to EPA 600/R-93/116: 1993, analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD).)	%	-	Negative	-
褐石綿/鐵石綿 (Amosite) (CAS No.: 12172-73-5)		%	-	Negative	-
斜方角閃石綿 (Anthophyllite) (CAS No.: 77536-67-5)		%	-	Negative	-
白石綿/溫石綿 (Chrysotile) (CAS No.: 12001-29-5)		%	-	Negative	-
青石綿 (Crocidolite) (CAS No.: 12001- 28-4)		%	-	Negative	-
透閃石綿 (Tremolite) (CAS No.: 77536- 68-6)		%	-	Negative	-

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 9 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
氟氯碳化物 (Chlorofluorocarbons) (CFCs)					
CFC-13 (CAS No.: 75-72-9)	參考US EPA 5021A: 2014 · 以氣相層析儀/ 質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
CFC-111 (CAS No.: 354-56-3)		mg/kg	1	n.d.	-
CFC-112 (CAS No.: 76-12-0)		mg/kg	1	n.d.	-
CFC-211 (CAS No.: 422-78-6)		mg/kg	1	n.d.	-
CFC-212 (CAS No.: 3182-26-1)		mg/kg	1	n.d.	-
CFC-213 (CAS No.: 2354-06-5)		mg/kg	1	n.d.	-
CFC-214 (CAS No.: 29255-31-0)		mg/kg	1	n.d.	-
CFC-215 (CAS No.: 4259-43-2)		mg/kg	1	n.d.	-
CFC-216 (CAS No.: 661-97-2)		mg/kg	1	n.d.	-
CFC-217 (CAS No.: 422-86-6)		mg/kg	1	n.d.	-
CFC-12 (CAS No.: 75-71-8)		mg/kg	1	n.d.	-
CFC-11 (CAS No.: 75-69-4)		mg/kg	1	n.d.	-
CFC-115 (CAS No.: 76-15-3)		mg/kg	1	n.d.	-
CFC-114 (CAS No.: 76-14-2)		mg/kg	1	n.d.	-
CFC-113 (CAS No.: 76-13-1)		mg/kg	1	n.d.	-
氟氯氫烷碳化物 (Hydrochlorofluorocarbons) (HCFCs)					
HCFC-21 (CAS No.: 75-43-4)	參考US EPA 5021A: 2014 · 以氣相層析儀/ 質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
HCFC-22 (CAS No.: 75-45-6)		mg/kg	1	n.d.	-
HCFC-31 (CAS No.: 593-70-4)		mg/kg	1	n.d.	-
HCFC-121 (CAS No.: 354-14-3)		mg/kg	1	n.d.	-
HCFC-122 (CAS No.: 354-21-2)		mg/kg	1	n.d.	-
HCFC-123 (CAS No.: 306-83-2)		mg/kg	1	n.d.	-
HCFC-124 (CAS No.: 2837-89-0)		mg/kg	1	n.d.	-
HCFC-131 (CAS No.: 359-28-4)		mg/kg	1	n.d.	-
HCFC-132b (CAS No.: 1649-08-7)		mg/kg	1	n.d.	-
HCFC-133a (CAS No.: 75-88-7)		mg/kg	1	n.d.	-
HCFC-142b (CAS No.: 75-68-3)		mg/kg	1	n.d.	-
HCFC-221 (CAS No.: 422-26-4)		mg/kg	1	n.d.	-
HCFC-222 (CAS No.: 422-49-1)		mg/kg	1	n.d.	-
HCFC-223 (CAS No.: 422-52-6)		mg/kg	1	n.d.	-
HCFC-224 (CAS No.: 422-54-8)		mg/kg	1	n.d.	-

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 10 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
HCFC-225ca (CAS No.: 422-56-0)	參考US EPA 5021A: 2014 · 以氣相層析儀/ 質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
HCFC-225cb (CAS No.: 507-55-1)		mg/kg	1	n.d.	-
HCFC-226 (CAS No.: 431-87-8)		mg/kg	1	n.d.	-
HCFC-231 (CAS No.: 421-94-3)		mg/kg	1	n.d.	-
HCFC-232 (CAS No.: 460-89-9)		mg/kg	1	n.d.	-
HCFC-233 (CAS No.: 7125-84-0)		mg/kg	1	n.d.	-
HCFC-234 (CAS No.: 425-94-5)		mg/kg	1	n.d.	-
HCFC-235 (CAS No.: 460-92-4)		mg/kg	1	n.d.	-
HCFC-241 (CAS No.: 666-27-3)		mg/kg	1	n.d.	-
HCFC-242 (CAS No.: 460-63-9)		mg/kg	1	n.d.	-
HCFC-244		mg/kg	1	n.d.	-
HCFC-251 (CAS No.: 421-41-0)		mg/kg	1	n.d.	-
HCFC-252 (CAS No.: 819-00-1)		mg/kg	1	n.d.	-
HCFC-261 (CAS No.: 420-97-3)		mg/kg	1	n.d.	-
HCFC-262 (CAS No.: 421-02-03)		mg/kg	1	n.d.	-
HCFC-271 (CAS No.: 430-55-7)		mg/kg	1	n.d.	-
HCFC-141b (CAS No.: 1717-00-6)		mg/kg	1	n.d.	-
HCFC-243 (CAS No.: 460-69-5)		mg/kg	1	n.d.	-
HCFC-253 (CAS No.: 460-35-5)	mg/kg	1	n.d.	-	
海龍 (Halons)					
Halon-1211 (CAS No.: 353-59-3)	參考US EPA 5021A: 2014 · 以氣相層析儀/ 質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
Halon-1301 (CAS No.: 75-63-8)	參考US EPA 5021A: 2014 · 以氣相層析儀/ 質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
Halon-2402 (CAS No.: 124-73-2)	參考US EPA 5021A: 2014 · 以氣相層析儀/ 質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 11 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
溴甲烷 (Bromomethane) (CAS No.: 74-83-9)	參考US EPA 5021A: 2014 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
不完全鹵化氟溴化物 (Hydrobromofluorocarbons) (HBFCs)					
HBFC-271B1 (C3H6FBr)	參考US EPA 5021A: 2014 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
HBFC-262B1 (C3H5F2Br)		mg/kg	1	n.d.	-
HBFC-261B2 (C3H5FBr2)		mg/kg	1	n.d.	-
HBFC-253B1 (C3H4F3Br)		mg/kg	1	n.d.	-
HBFC-252B2 (C3H4F2Br2)		mg/kg	1	n.d.	-
HBFC-251B3 (C3H4FBr3)		mg/kg	1	n.d.	-
HBFC-244B1 (C3H3F4Br)		mg/kg	1	n.d.	-
HBFC-243B2 (C3H3F3Br2)		mg/kg	1	n.d.	-
HBFC-242B3 (C3H3F2Br3)		mg/kg	1	n.d.	-
HBFC-241B4 (C3H3FBr4)		mg/kg	1	n.d.	-
HBFC-235B1 (C3H2F5Br)		mg/kg	1	n.d.	-
HBFC-234B2 (C3H2F4Br2)		mg/kg	1	n.d.	-
HBFC-233B3 (C3H2F3Br3)		mg/kg	1	n.d.	-
HBFC-232B4 (C3H2F2Br4)		mg/kg	1	n.d.	-
HBFC-231B5 (C3H2FBr5)		mg/kg	1	n.d.	-
HBFC-226B1 (C3HF6Br)		mg/kg	1	n.d.	-
HBFC-225B2 (C3HF5Br2)		mg/kg	1	n.d.	-
HBFC-224B3 (C3HF4Br3)		mg/kg	1	n.d.	-
HBFC-223B4 (C3HF3Br4)		mg/kg	1	n.d.	-
HBFC-222B5 (C3HF2Br5)		mg/kg	1	n.d.	-
HBFC-221B6 (C3HFBr6)		mg/kg	1	n.d.	-
HBFC-151B1 (C2H4FBr)		mg/kg	1	n.d.	-
HBFC-142B1 (C2H3F2Br)		mg/kg	1	n.d.	-
HBFC-141B2 (C2H3FBr2)		mg/kg	1	n.d.	-
HBFC-133B1 (C2H2F3Br)		mg/kg	1	n.d.	-
HBFC-132B2 (C2H2F2Br2)		mg/kg	1	n.d.	-
HBFC-131B3 (C2H2FBr3)		mg/kg	1	n.d.	-
HBFC-124B1 (C2HF4Br)		mg/kg	1	n.d.	-

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 12 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
HBFC-123B2 (C2HF3Br2)	參考US EPA 5021A: 2014 · 以氣相層析儀/ 質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
HBFC-122B3 (C2HF2Br3)		mg/kg	1	n.d.	-
HBFC-121B4 (C2HFBr4)		mg/kg	1	n.d.	-
HBFC-31B1 (CH2FBr) (CAS No.: 373-52-4)		mg/kg	1	n.d.	-
HBFC-22B1 (CHF2Br) (CAS No.: 1511-62-2)		mg/kg	1	n.d.	-
HBFC-21B2 (CHFB2) (CAS No.: 1868-53-7)		mg/kg	1	n.d.	-
氫氟碳化合物 (Hydrofluorocarbon) (HFCs)					
HFC-23 (CHF3) (CAS No.: 75-46-7)	參考US EPA 5021A: 2014 · 以氣相層析儀/ 質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
HFC-32 (CH2F2) (CAS No.: 75-10-5)		mg/kg	1	n.d.	-
HFC-41 (CH3F) (CAS No.: 593-53-3)		mg/kg	1	n.d.	-
HFC-43-10mee (C5H2F10)		mg/kg	1	n.d.	-
HFC-125 (C2HF5)		mg/kg	1	n.d.	-
HFC-134 (C2H2F4)		mg/kg	1	n.d.	-
HFC-134a (CH2FCF3) (CAS No.: 811-97-2)		mg/kg	1	n.d.	-
HFC-143 (CH3F3)		mg/kg	1	n.d.	-
HFC-143a (CH3F3)		mg/kg	1	n.d.	-
HFC-152a (C2H4F2) (CAS No.: 75-37-6)		mg/kg	1	n.d.	-
HFC-227ea (C3HF7) (CAS No.: 431-89-0)		mg/kg	1	n.d.	-
HFC-236fa (CAS No.: 431-63-0)		mg/kg	1	n.d.	-
HFC-245ca (C3H3F5)		mg/kg	1	n.d.	-
HFC-245fa (C3H3F5)		mg/kg	1	n.d.	-
HFC-365mfc (C4H5F5)		mg/kg	1	n.d.	-
HFC-236ea (C3H2F6) (CAS No.: 431-63-0)	mg/kg	1	n.d.	-	

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 13 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
全氟化碳 (Perfluorocarbon) (PFCs)					
全氟己烷 (Perfluorohexane) (CAS No.: 355-42-0)	參考US EPA 5021A: 2014 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
2-全氟甲基戊烷 (2-Perfluoromethylpentane) (CAS No.: 355-04-4)		mg/kg	1	n.d.	-
全氟戊烷 (Perfluoro-n-pentane) (CAS No.: 678-26-2)		mg/kg	1	n.d.	-
2-全氟甲基丁烷 (Nonafluor-2-(trifluoromethyl)butane) (CAS No.: 594-91-2)		mg/kg	1	n.d.	-
1,4-二氫八氟丁烷 (1,4-dihydrooctafluorobutane) (CAS No.: 377-36-6)		mg/kg	1	n.d.	-
全氟異丁烯 (Perfluorisobutene) (CAS No.: 382-21-8)		mg/kg	1	n.d.	-
八氟環丁烷 (Freon C318) (CAS No.: 115-25-3)		mg/kg	1	n.d.	-
十氟丁烷 (Decafluorobutane) (CAS No.: 355-25-9)		mg/kg	1	n.d.	-
八氟丙烷 (Freon 218) (CAS No.: 76-19-7)		mg/kg	1	n.d.	-
六氟乙烷 (Fluorocarbon 116) (CAS No.: 76-16-4)		mg/kg	1	n.d.	-
四氟甲烷 (F14) (CAS No.: 75-73-0)		mg/kg	1	n.d.	-
全氟-1-丁烯 (Perfluor-1-butene) (CAS No.: 357-26-6)		mg/kg	1	n.d.	-

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 14 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
氯碳氫化物 (Chlorinate hydrocarbon) (CHCs)					
反-1,3-二氯丙烯 (trans-1,3-Dichloropropene) (CAS No.: 10061-02-6)	參考US EPA 5021A: 2014 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
反-1,2-二氯乙烯 (trans-1,2-Dichloroethene) (CAS No.: 156-60-5)		mg/kg	1	n.d.	-
二氯甲烷 (Dichloromethane, Methylene chloride) (CAS No.: 75-09-2)		mg/kg	1	n.d.	-
六氯丁二烯 (Hexachlorobutadiene) (CAS No.: 87-68-3)		mg/kg	1	n.d.	-
順-1,3-二氯丙烯 (cis-1,3-Dichloropropene) (CAS No.: 10061-01-5)		mg/kg	1	n.d.	-
順-1,2-二氯乙烯 (cis-1,2-Dichloroethene) (CAS No.: 156-59-2)		mg/kg	1	n.d.	-
氯甲烷 (Chloromethane) (CAS No.: 74-87-3)		mg/kg	1	n.d.	-
四氯甲烷 (四氯化碳) (Carbon tetrachloride) (CAS No.: 56-23-5)		mg/kg	1	n.d.	-
2,2-二氯丙烷 (2,2-Dichloropropane) (CAS No.: 594-20-7)		mg/kg	1	n.d.	-
1,2-二氯乙烷 (1,2-Dichloroethane) (CAS No.: 107-06-2)		mg/kg	1	n.d.	-
1,1-二氯丙烯 (1,1-Dichloropropene) (CAS No.: 563-58-6)		mg/kg	1	n.d.	-
1,2,3-三氯丙烷 (1,2,3-Trichloropropane) (CAS No.: 96-18-4)		mg/kg	1	n.d.	-
氯仿 (Chloroform) (CAS No.: 67-66-3)		mg/kg	1	n.d.	-
1,2-二氯丙烷 (1,2-Dichloropropane) (CAS No.: 78-87-5)		mg/kg	1	n.d.	-
1,1,1,2-四氯乙烷 (1,1,1,2-Tetrachloroethane) (CAS No.: 630-20-6)		mg/kg	1	n.d.	-

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頁數(Page): 15 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
1,1,1-三氯乙烷 (1,1,1-Trichloroethane) (CAS No.: 71-55-6)	參考US EPA 5021A: 2014 · 以氣相層析儀/ 質譜儀分析。(With reference to US EPA 5021A: 2014, analysis was performed by GC/MS.)	mg/kg	1	n.d.	-
1,1,2-三氯乙烷 (1,1,2-Trichloroethane) (CAS No.: 79-00-5)		mg/kg	1	n.d.	-
1,1,2,2-四氯乙烷 (1,1,2,2- Tetrachloroethane) (CAS No.: 79-34-5)		mg/kg	1	n.d.	-
1,1-二氯乙烯 (1,1-Dichloroethylene) (CAS No.: 75-35-4)		mg/kg	1	n.d.	-
1,1-二氯乙烷 (1,1-Dichloroethane) (CAS No.: 75-34-3)		mg/kg	1	n.d.	-
氯乙烷 (Chloroethane) (CAS No.: 75-00- 3)		mg/kg	1	n.d.	-
四氯乙烯 (Tetrachloroethene) (CAS No.: 127-18-4)		mg/kg	1	n.d.	-
三氯乙烯 (Trichloroethylene) (CAS No.: 79-01-6)		mg/kg	1	n.d.	-
1,3-二氯丙烷 (1,3-Dichloropropane) (CAS No.: 142-28-9)		mg/kg	1	n.d.	-
溴氯甲烷 (Bromochloromethan) (CAS No.: 74-97-5)		mg/kg	1	n.d.	-
六氟化硫 (Sulfur hexafluoride) (CAS No.: 2551-62-4)		mg/kg	1	n.d.	-
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.
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440- 41-7)	mg/kg		2	n.d.	-
砷 (As) (Arsenic (As)) (CAS No.: 7440- 38-2)	mg/kg		2	n.d.	-

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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 16 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

備註(Note) :

1. mg/kg = ppm ; 0.1wt% = 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. 石綿定性分析試驗範圍： <0.1%~100% · 石綿鑑定的判定基準是以檢出含有石綿纖維為『Positive』 · 未檢出石綿纖維為『Negative』。(Testing range of asbestos qualitative analysis is from less than 0.1% to 100%. The judgment criterion: asbestos fibers being found is shown as "Positive"; asbestos fibers not being found is shown as "Negative".)
8. 全氟辛烷磺酸及其鹽類包含 (PFOS and its salts including) :
CAS No.: 29081-56-9, 2795-39-3, 29457-72-5, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7.
9. 全氟辛酸及其鹽類包含 (PFOA and its salts including) :
CAS No.: 3825-26-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0.
10. (#2) =
 - a. 當六價鉻結果大於0.13 µg/cm² · 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 µg/cm². 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 µg/cm²) · 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 µg/cm²). The coating is considered a non-Cr(VI) based coating)
 - c. 當六價鉻結果介於 0.10 及 0.13 µg/cm² 時 · 無法確定塗層是否含有六價鉻。(The result between 0.10 µg/cm² and 0.13 µg/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination.)
11. ▲ : 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) : $AX = A \times F$

AX	A	F
氧化雙三丁基錫 (Bis(tributyltin)oxide) (TBTO)	三丁基錫 (Tributyl Tin) (TBT)	1.024

參數換算表 (Parameter Conversion Table) :

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

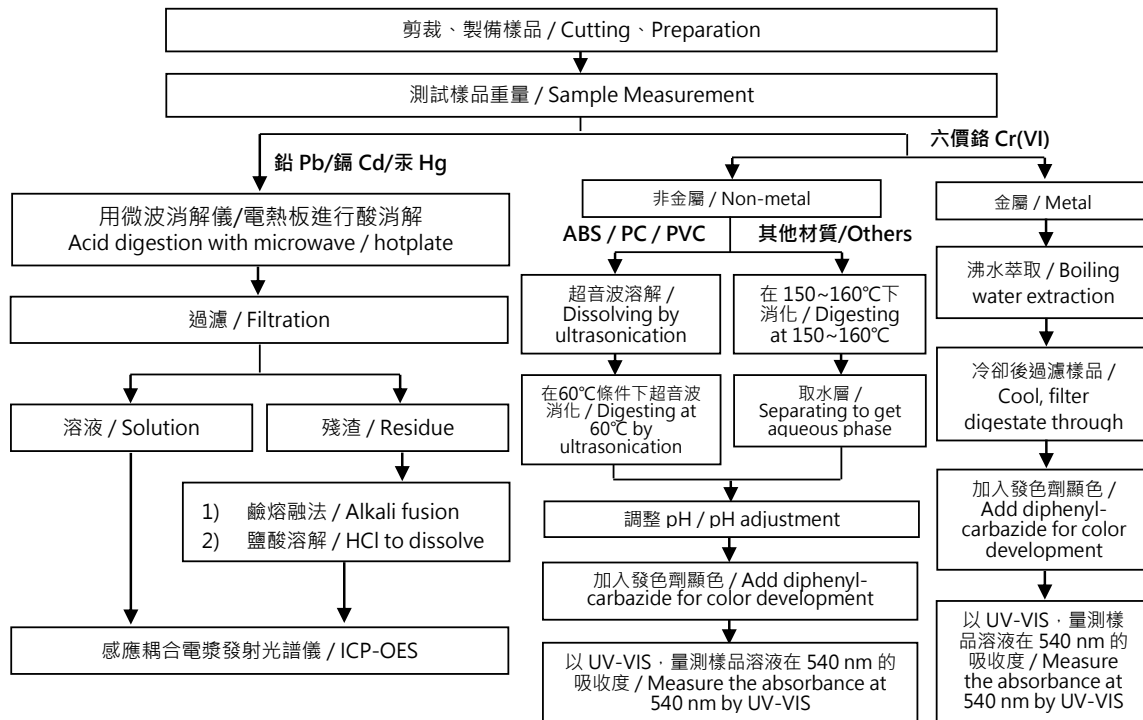
12. 符合性結果之判定係以測試結果與限值做比較。(The statement of compliance conformity is based on comparison of testing results and limits.)

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)



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測試報告

Test Report

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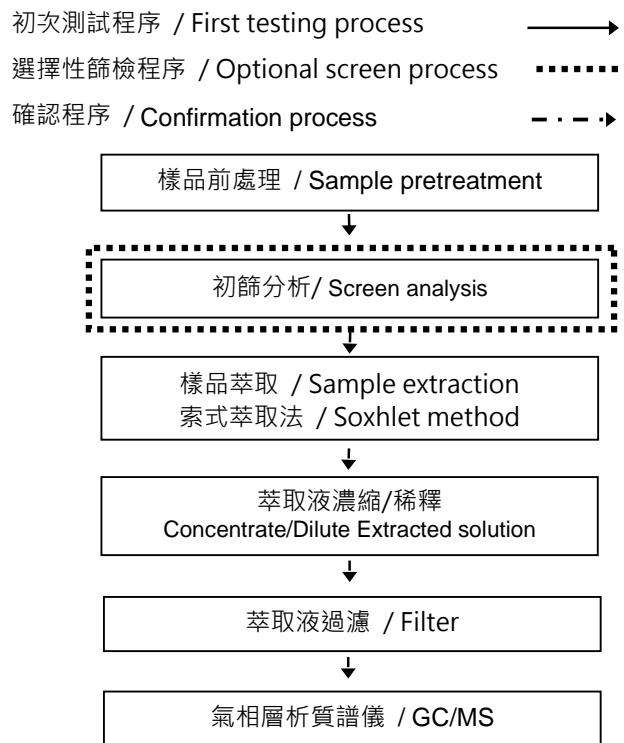
日期(Date): 18-Jan-2021

頁數(Page): 18 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

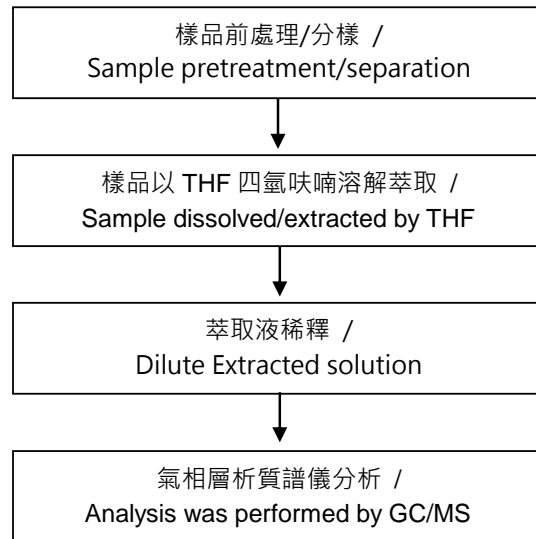
多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBBs/PBDEs



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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】



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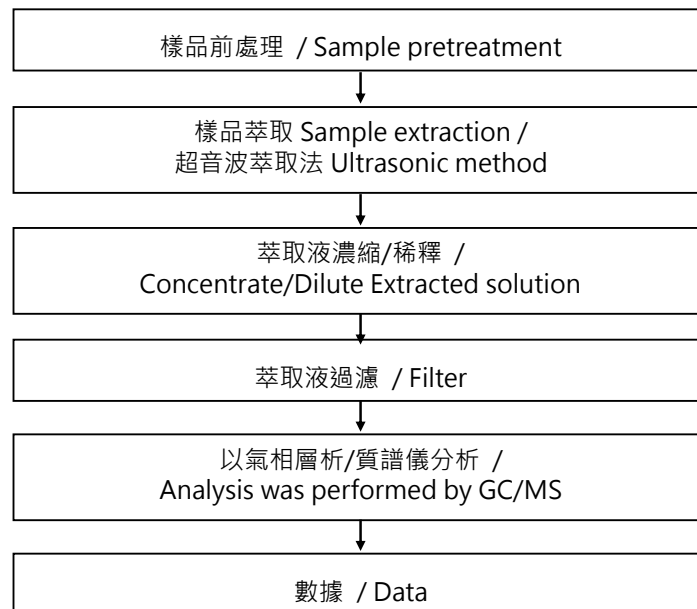
日期(Date): 18-Jan-2021

頁數(Page): 20 of 29

UMICORE THIN FILM PRODUCTS AG.

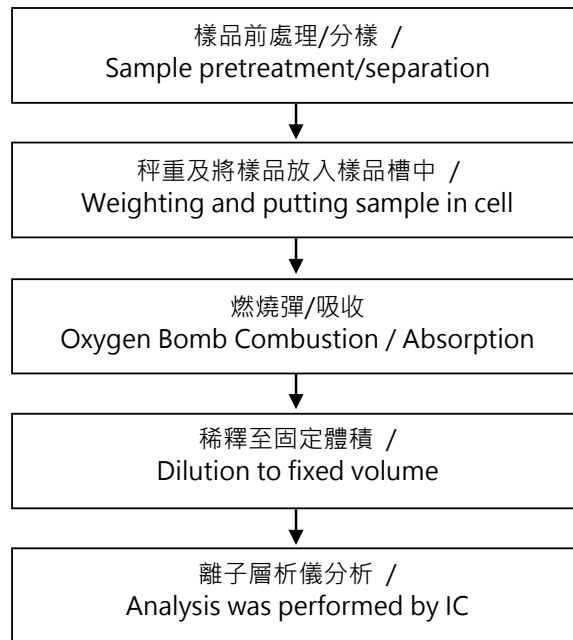
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六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD



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



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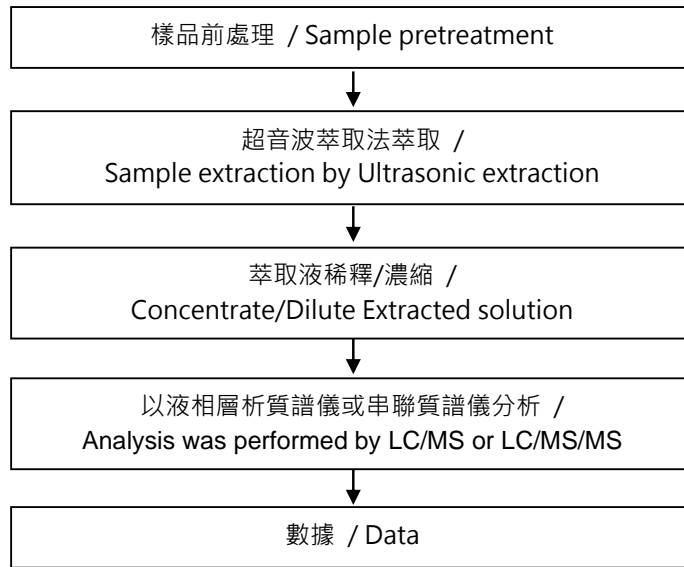
日期(Date): 18-Jan-2021

頁數(Page): 22 of 29

UMICORE THIN FILM PRODUCTS AG.

ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

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



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日期(Date): 18-Jan-2021

頁數(Page): 23 of 29

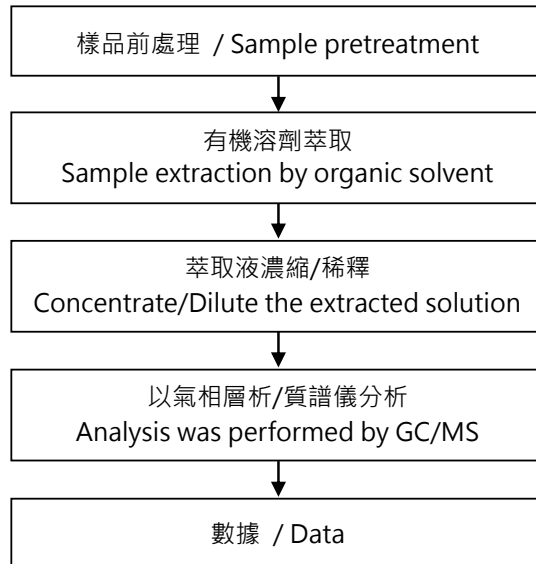
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分析流程圖 / Analytical flow chart

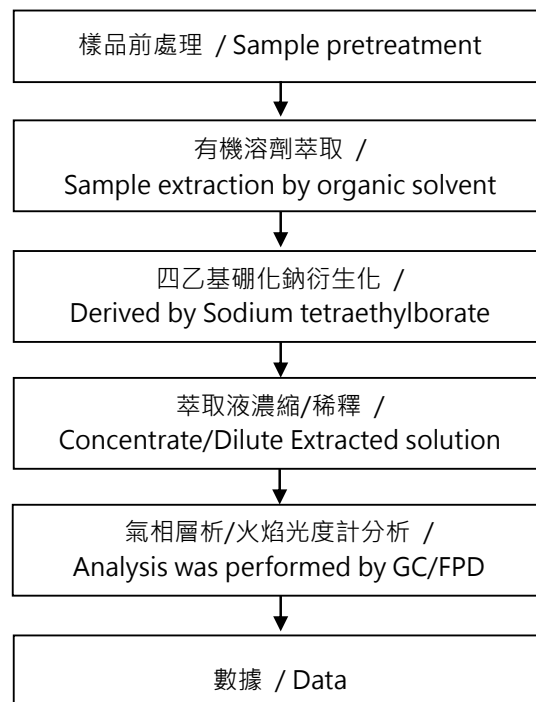
【適用於：多氯聯苯、多氯奈、多氯三聯苯、滅蟻靈、氯化石蠟、DBBT】

*Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT



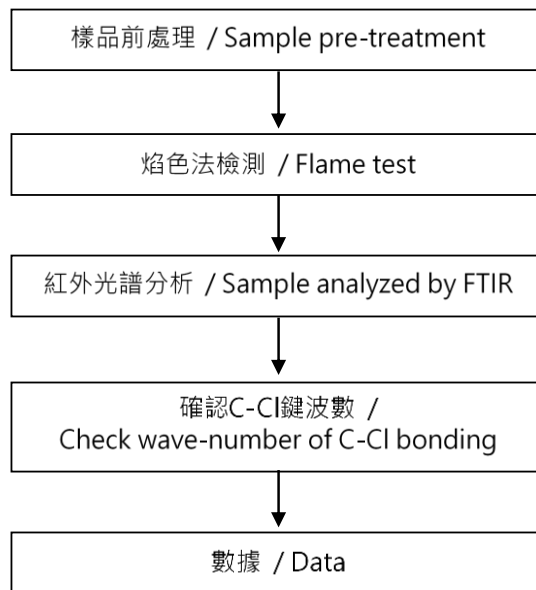
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有機錫分析流程圖 / Analytical flow chart - Organic-Tin



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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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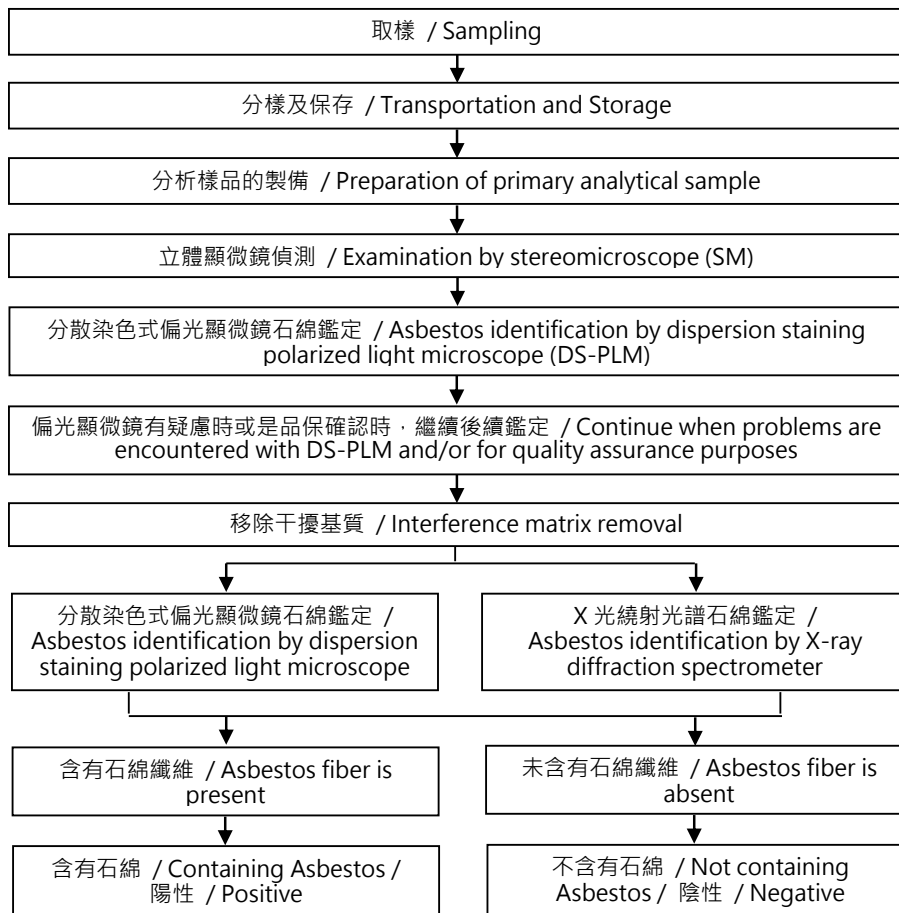
頁數(Page): 26 of 29

UMICORE THIN FILM PRODUCTS AG.

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石綿鑑定分析流程圖 / Analysis flow chart for determination of Asbestos

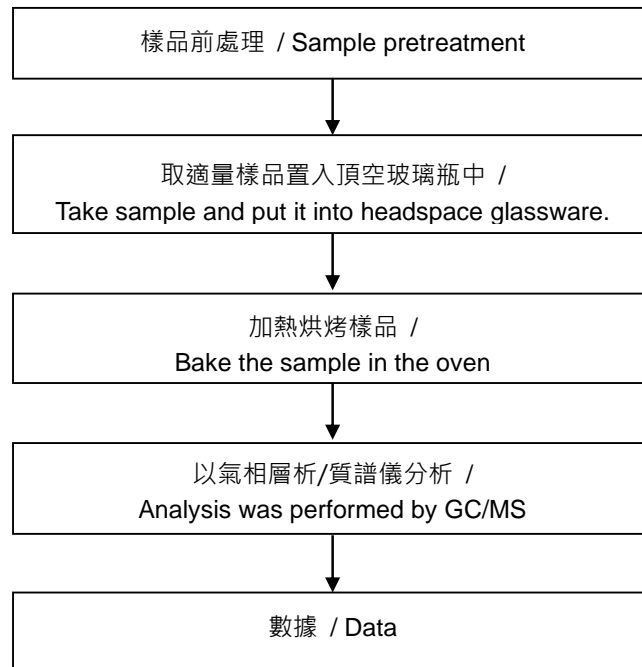
【參考方法(Reference method): EPA 600/R-93/116】



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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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測試報告

Test Report

號碼(No.): ETR21101428

日期(Date): 18-Jan-2021

頁數(Page): 28 of 29

UMICORE THIN FILM PRODUCTS AG.

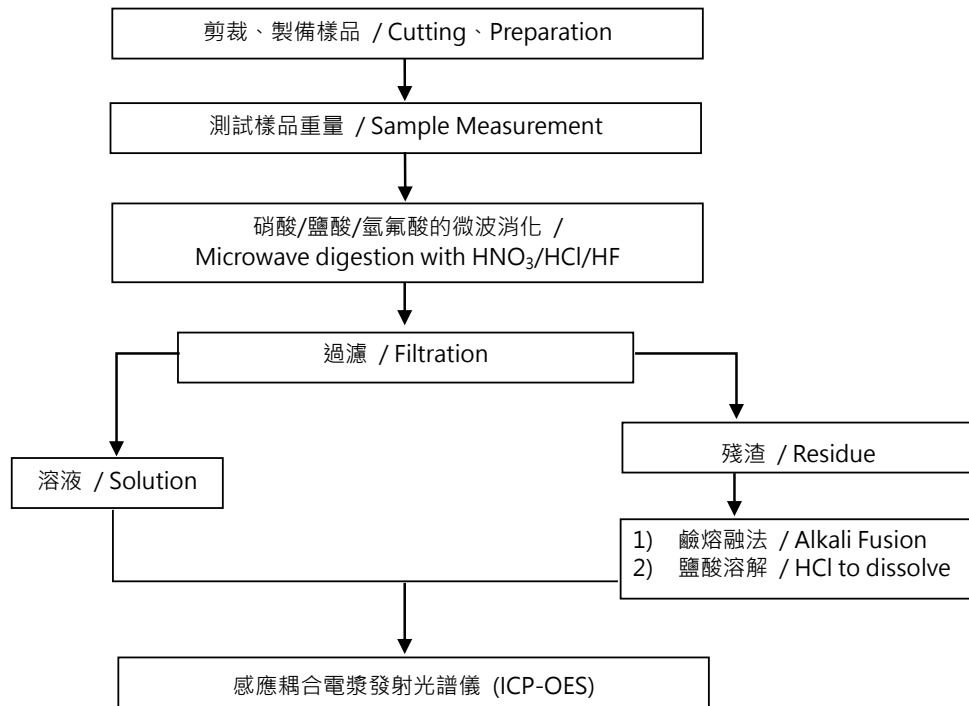
ALTE LANDSTRASSE 8, P.O. BOX 364, FL-9496 BALZERS

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。

These samples were dissolved totally by pre-conditioning method according to below flow chart.

【參考方法/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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* 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.)

ETR21101428



** 報告結尾 (End of Report) **

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