

APPROVAL SHEET

經昌汽車電子工業股份有限公司

Item : S2520A Crystal

Spec. no : S2520A-032000-T06-BBC-1AVA

Freq : 32.000 MHz

Customer Approved	Checked By	Issued By
		

請自發行日起2週內簽回此份規格書，若未簽回，則視為同意此規格。

友桂電子股份有限公司 YOKETAN CORPORATION

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(二廠)台中市潭子區台中加工出口區南二路12號	Tel: 886-4-25333353	Fax: 886-4-25338675
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中國深圳公司 : (518112) 深圳市龍崗區布吉街道百合星城百合酒店及住宅樓D棟15I	Tel: 86-755-25936978	Fax: 86-755-25907970
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SPECIFICATION OF CRYSTAL UNITS

YOKETAN CORP.

Customer : 經昌

SPEC NO : S2520A-032000-T06-BBC-1AVA

Date : 17-Sep-19

1 General

1-1 Enclosure:	S2520A (Lead Free Parts)
1-2 Application:	
1-3 Overtone Order :	Fundamental
1-4 Crystal unit Frequency :	32.000 MHz
1-5 Frequency Deviation :	
1-5-1 At Reference Temperature :	$\pm 10\text{ppm at } 25 \pm 3^\circ\text{C}$
1-5-2 At Operating Temperature :	$\pm 10\text{ppm in 1-6 (Refer to } 25^\circ\text{C)}$
1-6 Operating Temperature Range :	$-20^\circ\text{C to } +70^\circ\text{C}$
1-7 Storage Temperature Range :	$-40^\circ\text{C to } +85^\circ\text{C}$

2 Circuit

2-1 Measurement Instrument :	S&A 250B(Measured FL)
2-2 Load Capacitance :	$6\text{pF} \pm 0.3\text{pF}$
2-3 Level of Drive :	100uW

3 Electrical Performance

3-1 Equivalent Series Resistance:	Less than 60 ohms
3-2 Electrostatic Capacitance :	3.0pF Max.
3-3 Insulation Resistance :	More than 500Mohms at DC100V
3-4 Aging:	$\pm 2\text{ppm/year Max.}$

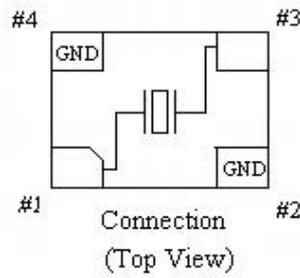
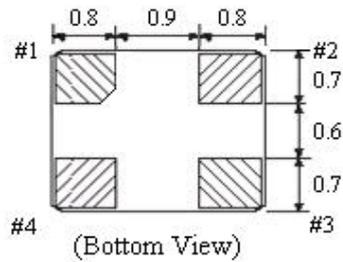
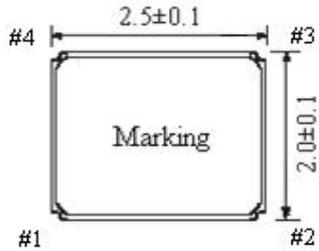
4 Marking

. 32.0Y

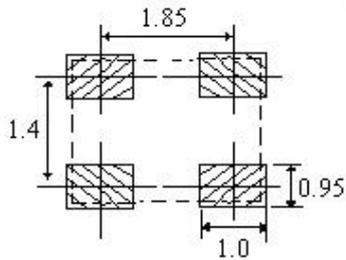
SPECIFICATION OF CRYSTAL UNITS

YOKETAN CORP.

Dimensions

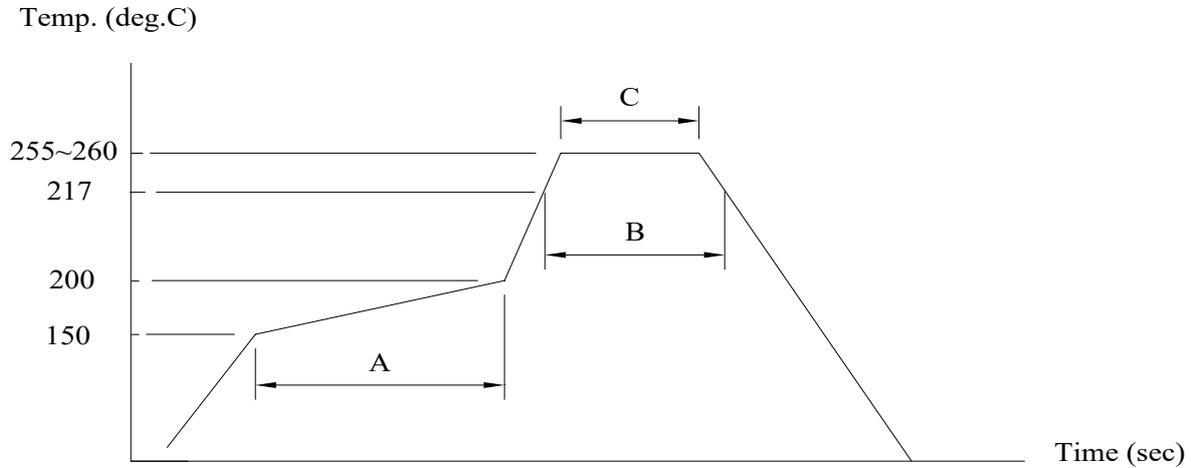


Recommended Soldering Pattern



	Date	Name	Unit : mm	
Drawn	20.Oct.2014	Leo	Title Dimension of External	Drawing No. PKX-252055-1020
Checked	20.Oct.2014	Iris		
Approved	20.Oct.2014	Wan		

Soldering Reflow



(A)→Preheating area : 150~200°C, 60~120sec.

(B)→Heating area : 217°C, 60~150sec.

(C)→Peak temperature : 255~260°C, 30sec. Max.

Ramp-up rate (217→260°C) : 3°C/sec. Max.

Ramp-down rate (260→217°C) : 6°C/sec. Max.

Time 25°C→260°C : 480sec. Max.

*Referance JEDEC J-STD-020

Note:

The crystal characteristics may be affected and destroyed at worst by additional production process as ultrasonic welding or molding encapsulation.... Please be sure to check if this process affects any damage to crystal products prior to use.

SPECIFICATION OF CRYSTAL & OSC UNITS

YOKETAN CORP.

Reliability Test (applicable to SMD type OSC and X'tal)

Condition B.1

Test Items	Test Condition	Specification	
		General OSC (Note:1)(Note:3)	General X'tal (Note:2)
1. Gross Leak Test	Electronic test fluid 125°C/30sec	No continuous bubble	
2. Fine Leak Test	Bombing of He 4.5kg/cm ² for 1.5 hours	Less than 1*10 ⁻⁸ atm.c.c./sec, Helium	
3. Drop Test	a ~19.999MHz(Fund.) →75 cm height b. 20~29.999MHz(Fund.) →50 cm height c. 30~ MHz(Fund.) →20 cm height on hard wooden surface / 3 times (thickness more than 30 mm)	△F ≤±10PPM , Duty within spec.	△F ≤±10PPM , △C.I. ≤±10ohms
4. Vibration Test	Freq. range: 10~55Hz Peak to peak amplitude:1.5mm 3 direction(X,Y,Z) , each 60min.	△F ≤±10PPM , Duty within spec.	△F ≤±10PPM , △C.I. ≤±10ohms
5. Shearing Test	Weight : 5N, Test duration : 10±1 sec	△F ≤±10PPM , Duty within spec.	△F ≤±10PPM , △C.I. ≤±10ohms
6. Substrate Bending Test	Test duration : 5±1 sec Amount of substrate : 3mm	△F ≤±10PPM , Duty within spec.	△F ≤±10PPM , △C.I. ≤±10ohms
7. Resistance to Soldering Test	IR Reflow furnace with the condition 2 times. Peak temp.260±3°C , 10sec(Min.)	△F ≤±10PPM , Duty within spec.	△F ≤±10PPM , △C.I. ≤±10ohms
8. Low Temp. Exposure Test	-40±3°C , 240±12 hrs	△F ≤±10PPM , Duty within spec.	△F ≤±10PPM , △C.I. ≤±10ohms
9. Aging Test	125±3°C , 240±12hrs	△F ≤±10PPM , Duty within spec.	△F ≤±10PPM , △C.I. ≤±10ohms
10. High Temp. & Humidity Test	+85°C±5°C & 85%±5% R.H. , 240±12 hrs	△F ≤±10PPM , Duty within spec.	△F ≤±10PPM , △C.I. ≤±10ohms
11. Temperature Cycling Test	-20±3°C/15±3min ~ +70±3°C/15±3min 15cycles	△F ≤±10PPM , Duty within spec.	△F ≤±10PPM , △C.I. ≤±10ohms

Note:1 → For communication application the spec. demanded "△F ≤±5 PPM, Duty within spec." ◦

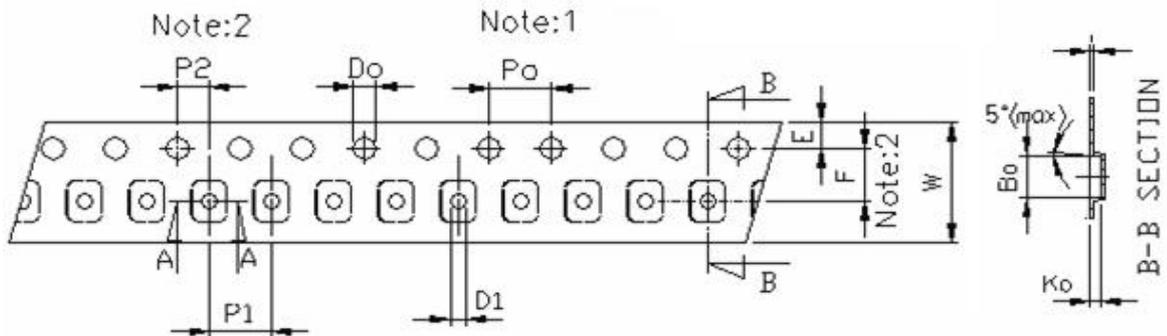
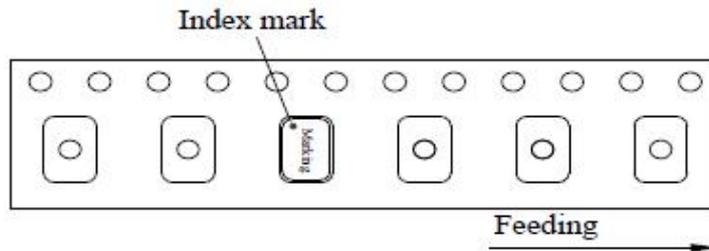
Note:2 → For communication application the spec. demanded "△F ≤±5 PPM, △C.I. ≤±5 ohms" ◦

Note:3 → For TCXO series products demanded "△F ≤±2PPM,Duty(Vpp) within spec" ◦

SPECIFICATION OF TAPE & REEL

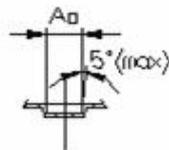
YOKETAN CORP.

Taping



Unit: mm

Symbol	Spec.
K1	-
Po	4.0±0.10
P1	4.0±0.10
P2	2.0±0.05
Do	1.55±0.05
D1	1.10±0.10
E	1.75±0.10
F	3.50±0.05
10Po	40.0±0.20
W	8.0±0.20
T	0.25±0.05



A-A SECTION

$$A_o = \frac{2.25 \pm 0.05}{\text{mm}}$$

$$B_o = \frac{2.70 \pm 0.05}{\text{mm}}$$

$$K_o = \frac{0.80 \pm 0.05}{\text{mm}}$$

Notice:

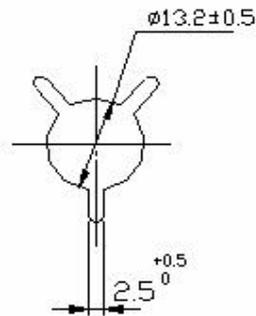
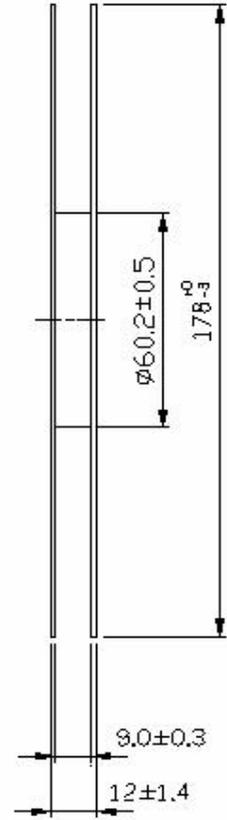
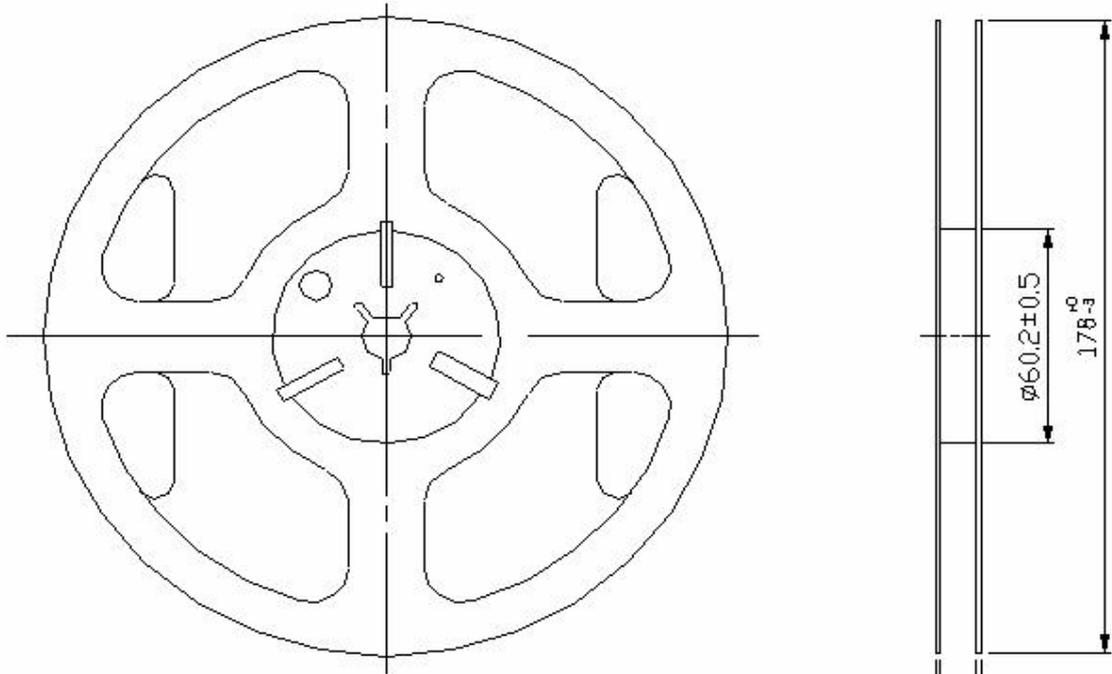
- 10 Sprocket hole pitch cumulative tolerance is ±0.20mm
- Pocket position relative to sprocket hole measured as true position of pocket not pocket hole.
- Ao & Bo measured on a place 0.3mm above the bottom of the pocket to top surface of the carrier.
- Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
- Carrier camber shall be not than 1mm per 100mm through a length of 250mm.

	Date	Name	Unit : mm	
Drawn	11.Jan.2018	Leo	Title	Drawing No.
Checked	11.Jan.2018	Iris	Tape & Reel Dimension	C009-020208-X-1101-R
Approved	11.Jan.2018	Wan		

SPECIFICATION OF TAPE & REEL

YOKETAN CORP.

Reel



Unit:mm

Q'ty:3000pcs/reel

	Date	Name	Unit : mm	
Drawn	22.Jan.2007	Leo	Title Tape & Reel Dimension	Drawing No. C009-0709-A-1001
Checked	22.Jan.2007	Iris		
Approved	22.Jan.2007	Wan		

測試報告 Test Report

號碼(No.) : CE/2019/11113 日期(Date) : 2019/01/11

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友桂電子股份有限公司
YOKETAN CORPORATION

台中市潭子區台中加工出口區南二路28號之2

28-2, NAN 2ND ROAD, T. E. P. Z, TANTZU DISTRICT, TAICHUNG CITY (427), TAIWAN.

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) : 友桂電子股份有限公司 (YOKETAN CORPORATION)
樣品名稱(Sample Description) : CERAMIC SMD SERIES
收件日期(Sample Receiving Date) : 2019/01/04
測試期間(Testing Period) : 2019/01/04 to 2019/01/11

測試需求(Test Requested) :

- (1) 依據客戶指定, 檢測鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP. (As specified by client, to test Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).)
- (2) 依據客戶指定, 進行鹵素-氟、氯、溴、碘測試. (As specified by client, to test Halogen-Fluorine, Chlorine, Bromine, Iodine contents in the submitted sample(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. TAIWAN
Chemical Laboratory - Taipei

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YOKETAN CORPORATION

台中市潭子區台中加工出口區南二路28號之2

28-2, NAN 2ND ROAD, T. E. P. Z, TANTZU DISTRICT, TAICHUNG CITY (427), TAIWAN.

測試結果(Test Results)

測試部位(PART NAME)No. 1 : 整體混測 (MIXED ALL PARTS)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	MDL	結果 (Result)
				No. 1
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 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), 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), 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 62321-7-2 (2017), 以UV-VIS檢測. / With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n. d.
多溴聯苯總和 / Sum of PBBs	mg/kg	參考IEC 62321-6 (2015), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	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	5	n. d.	

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YOKETAN CORPORATION

台中市潭子區台中加工出口區南二路28號之2

28-2, NAN 2ND ROAD, T. E. P. Z, TANTZU DISTRICT, TAICHUNG CITY (427), TAIWAN.

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	MDL	結果 (Result)
				No. 1
多溴聯苯醚總和 / Sum of PBDEs	mg/kg	參考IEC 62321-6 (2015), 以氣相層析/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		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.	
鄰苯二甲酸二(2-乙基己基)酯 / DEHP (Di-(2-ethylhexyl) phthalate) (CAS No. : 117-81-7)	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.
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No. : 85-88-7)	mg/kg		50	n. d.
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No. : 84-74-2)	mg/kg		50	n. d.
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No. : 84-69-5)	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	n. d.
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.

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28-2, NAN 2ND ROAD, T. E. P. Z, TANTZU DISTRICT, TAICHUNG CITY (427), TAIWAN.

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. 樣品的測試是基於申請人要求混合測試，報告中的混合測試結果不代表其中個別單一材質的含量。
(The samples was/were analyzed on behalf of the applicant as mixing sample in one testing. The above results was/were only given as the informality value.)

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台中市潭子區台中加工出口區南二路28號之2

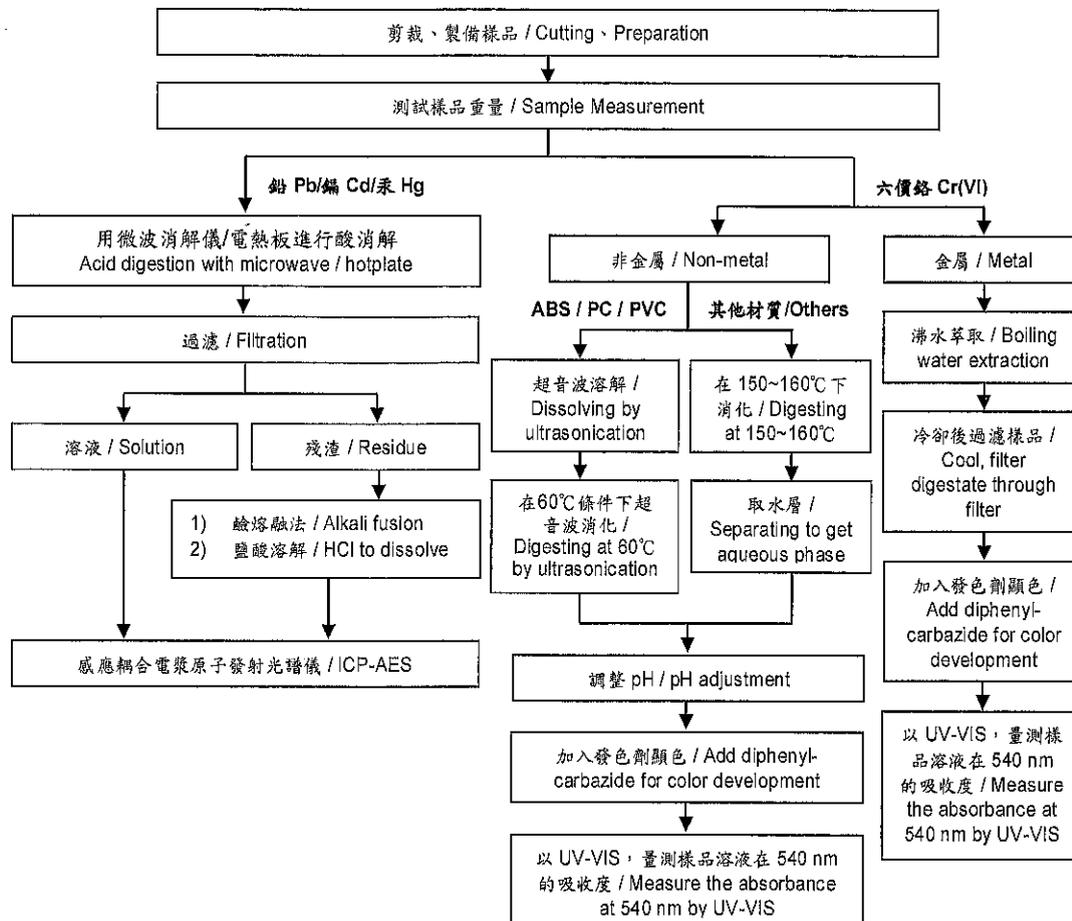
28-2, NAN 2ND ROAD, T. E. P. Z, TANTZU DISTRICT, TAICHUNG CITY (427), TAIWAN.

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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測試報告 Test Report

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友桂電子股份有限公司
YOKETAN CORPORATION

台中市潭子區台中加工出口區南二路28號之2

28-2, NAN 2ND ROAD, T. E. P. Z, TANTZU DISTRICT, TAICHUNG CITY (427), TAIWAN.

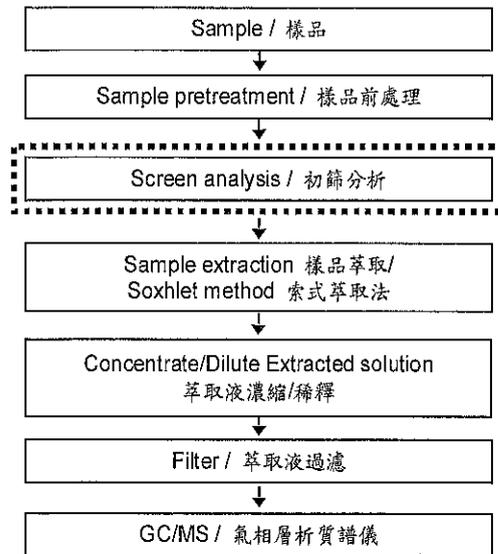
多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBB/PBDE

- 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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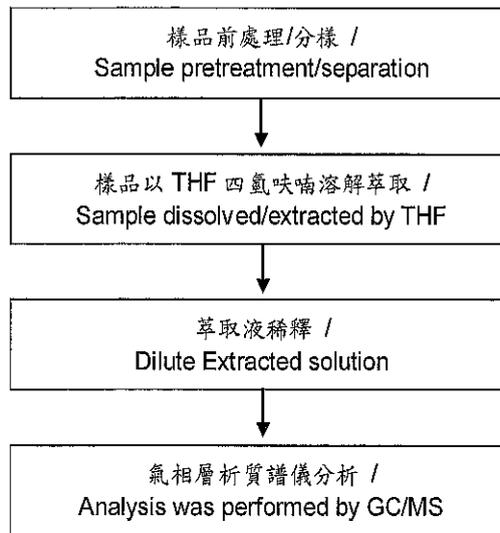
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可塑劑分析流程圖 / Analytical flow chart - Phthalate

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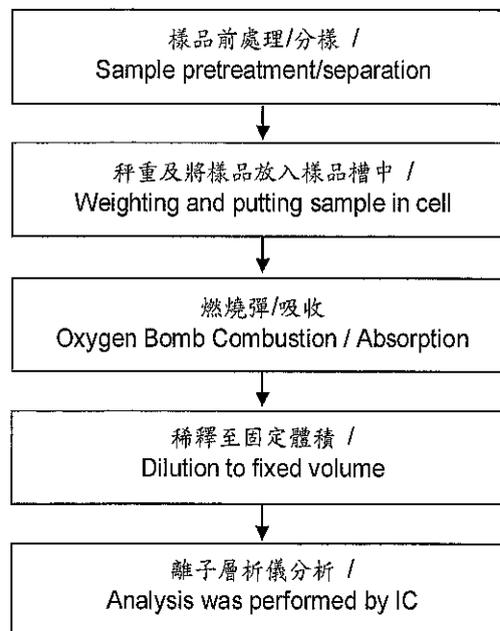
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鹵素分析流程圖 / Analytical flow chart - Halogen

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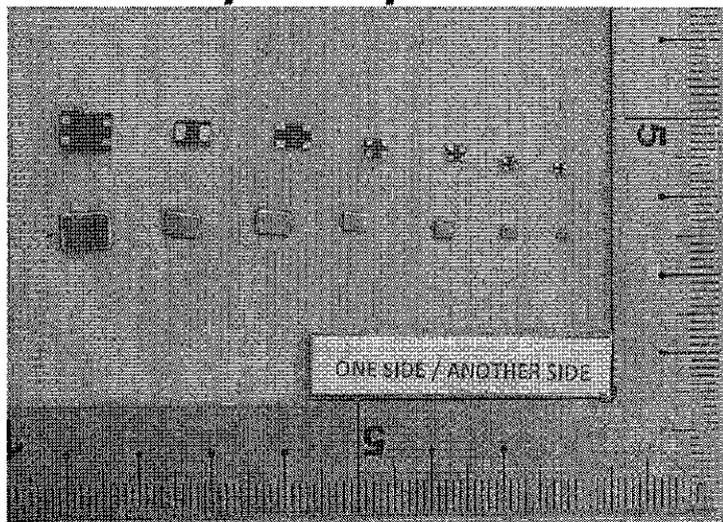
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* 照片中如有箭頭標示，則表示為實際檢測之樣品/部位。*
(The tested sample / part is marked by an arrow if it's shown on the photo.)

CE/2019/11113



** 報告結尾 (End of Report) **