

APPROVAL SHEET
承認書

Customer

茂傑國際股份有限公司

Customer Part No.

4Z0PW611RX1001

HT-TECH Part No.

FPCB45-I

Product Specification

antenna 5.15G,cable=45mm

Issued Date

2022/12/5

HT-TECH CORPORATION			Customer
APPROVED	CHECKED	DESIGNER	APPROVAL SAIGNATURE
Alan	Tony	Vincent	

承認書索引

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製作變更記錄

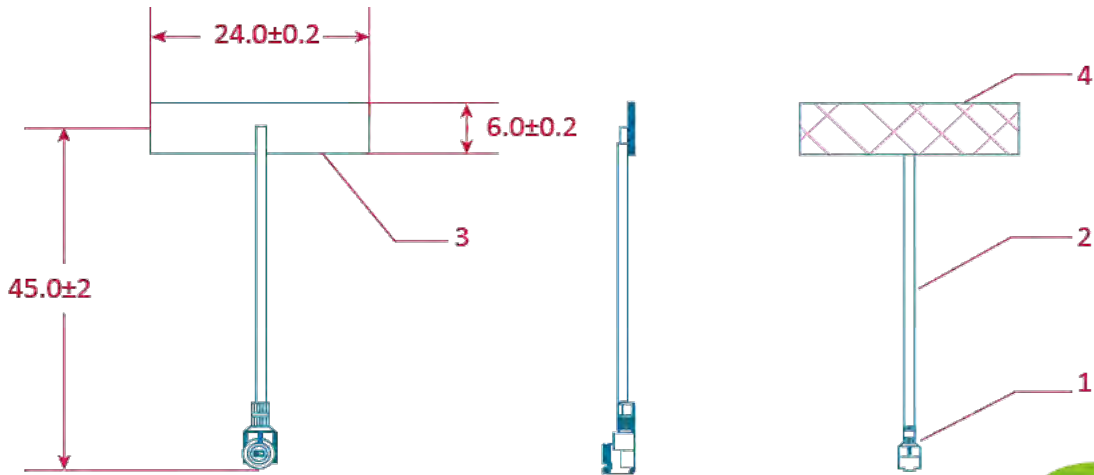
製作履歷	料號	日期	版本	製作	檢查	審核
1. 承認書 發行	FPCB45-I	2022/11/24	V1	Vincent	Tony	Alan
製作履歷		日期	版本	製作	檢查	審核
2. 新增測試資訊		2023/3/9	V2	Vincent	Tony	Alan
3. 新增設備校正資料		2023/3/15	V3	Vincent	Tony	Alan

SPECIFICATION FOR APPROVED
樣品承認書

2022
 NEW

料號 P/N : FPCB45-I

機構圖 Shape and Dimensions(mm) :



NO.	品名	規格	XXX.	±2.0	單位	mm	類別	成品圖
①	Connector	1.13, 國產一代端子	XX.	±1.0	視角		圖號	SX
②	CABLE	1.13, BLACK	X.	±0.5	版本	X1	工程	
③	PCB	24.0*6.0, T=0.4mm	. X	±0.2	比例	1/1	品質	
④	背膠	3M 9888	. XX	±0.1	日期	2022/11/24	核准	

電氣參數			
頻率	5.15-5.85GHz		
輸入阻抗	50 Ω		
駐波	2.0 Max		
最大增益	<5.0 dBi	效率	≥ 50%
方向	全向	結構形式	偶極
機械參數			
線長	45mm	連接器	I-PEX I (國產重鍍金)
饋線	1.13mm同軸線	產品顏色	黑色
環境參數			
工作溫度	-40 ~ +85°C		
儲存溫度	-30 ~ +60°C		

料號 P/N : FPCB45-I

測試報告:

Test Date : 2022/11/22

Test personnel : Smith

Shielding Room : ETS AMS 8500

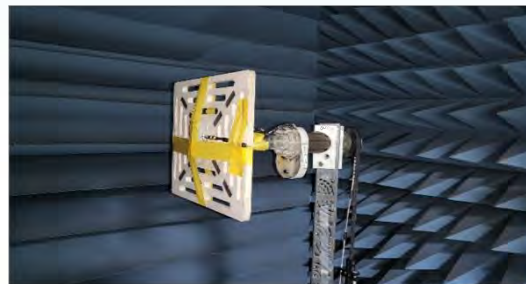
Test Equipment : ENA Series vector network analyzer (KEYSIGHT : E5080B)

Names of commercial test software being used : EMQuestViewer_V1.08

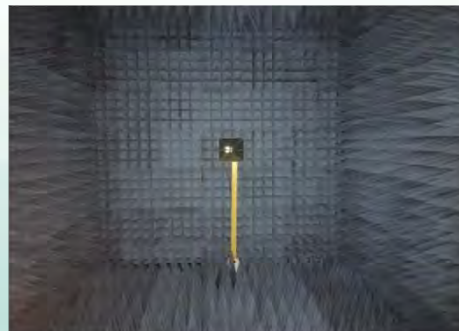
Date of Calibration : 6/MAR/2022



ETS(**CTIA standard**)
AMS-8500
Full Size Rectangular Anechoic Chamber
7.32 m L x 3.66 m W x 3.66 m H
(24 ft. x 12 ft. x 12 ft.)
Frequency Range: 700 MHz - 6 GHz



待測物



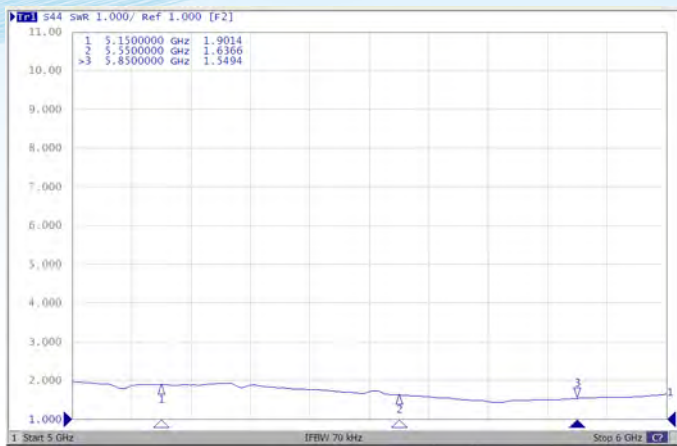
HORN

料號 P/N : FPCB45-I

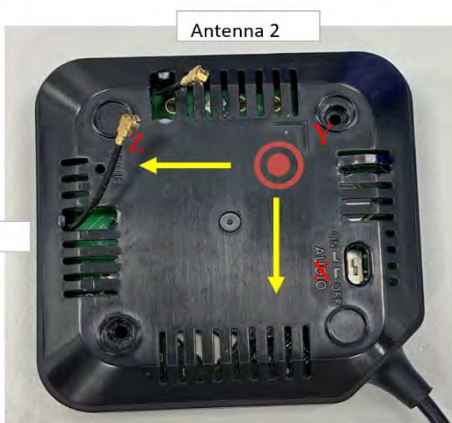
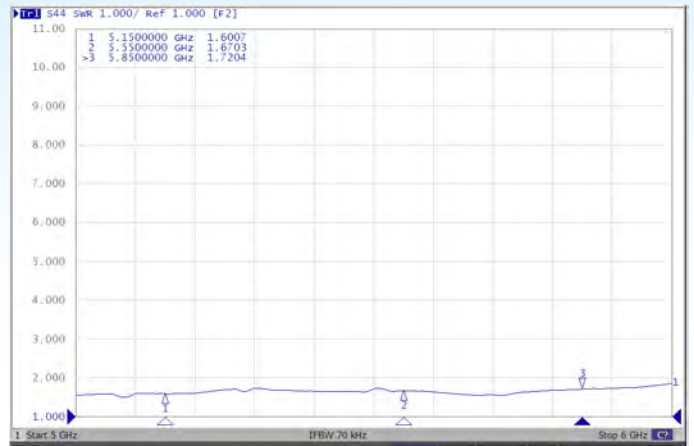
測試報告:

VSWR :

天線位置1



天線位置2



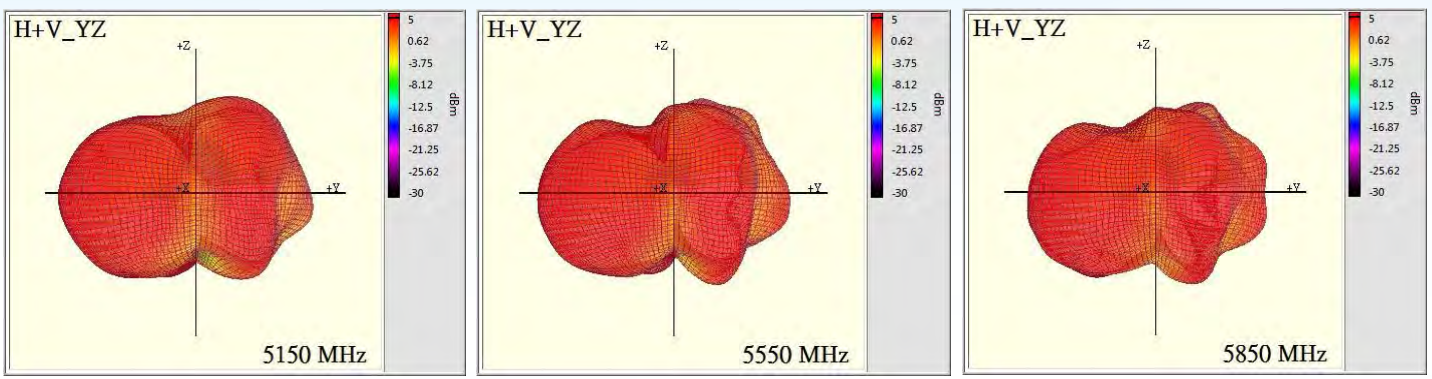
料號 P/N : FPCB45-I

測試報告:

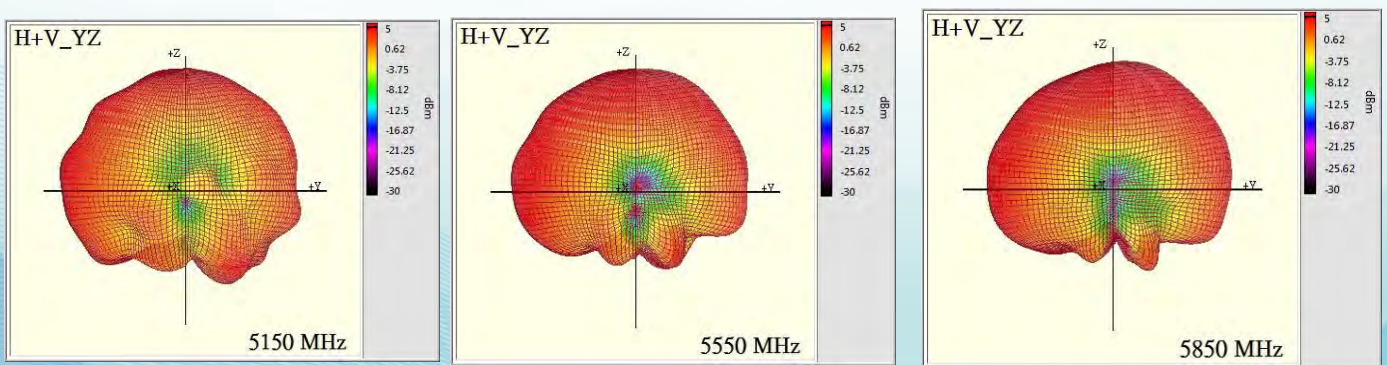
增益和效率

Radiation Pattern

位置1



位置2



料號 P/N : FPCB45-I

Gain & Efficiency Test Data

位置1

Antenna 1								
Frequency (MHz)	5150	5250	5350	5450	5550	5650	5750	5850
Peak Gain (dBi)	4.34	4.64	4.53	4.53	4.59	4.34	4.63	4.55
Directivity (dBi)	7.09	7.35	7.31	7.33	7.13	7.07	6.99	6.89
Efficiency (dB)	-2.75	-2.71	-2.78	-2.81	-2.54	-2.73	-2.36	-2.34
Efficiency (%)	53.14	53.58	52.75	52.41	55.73	53.3	58.04	58.35

位置2

Antenna 2								
Frequency (MHz)	5150	5250	5350	5450	5550	5650	5750	5850
Peak Gain (dBi)	2.98	3.2	3.5	3.81	4.46	4.4	4.47	4.58
Directivity (dBi)	5.88	6.05	6.3	6.8	6.75	6.81	6.74	6.84
Efficiency (dB)	-2.9	-2.85	-2.8	-2.99	-2.29	-2.41	-2.27	-2.26
Efficiency (%)	51.27	51.83	52.53	50.26	58.96	57.42	59.24	59.47



Keysight Technologies Malaysia Sdn Bhd (463532-M)
 Bayan Lepas Free Industrial Zone
 11900 Penang, Malaysia



5962-0476

Certificate of Calibration

ISO/IEC 17025:2017

Certificate No: 4524978-5592906-1

Manufacturer: Keysight Technologies
Model No: E5080B
Options Installed With Specifications: 290

Description: ENA Series vector network analyzer
Serial No: MY59202160

Date of Calibration: 06-MAR-2022
Temperature: (23 ± 3) °C
Procedure: ATM-09-Z7014,ATM-09-Z7015

Humidity: (40 to 70)% RH

This certifies that the equipment has been calibrated using applicable Keysight Technologies procedures and in compliance with ISO/IEC 17025:2017 and ANSI/NC SL Z540.3-2006. The quality management system is registered to ISO 9001:2015.

As Received Conditions: Factory tested. No incoming data available.

Action Taken:

- No corrective actions were necessary.

As Shipped Conditions: At the completion of the calibration, measured values were IN SPECIFICATION at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values were in specification.

Remarks or special requirements:

Notes:

- 1.This calibration report may refer to equipment manufactured by HP, Agilent and Keysight as being manufactured by Keysight Technologies, Inc.
- 2.The test limits stated in the calibration report correspond to the published specifications of the equipment, at the points tested.
- 3.The documented test results relate to the equipment tested only.
- 4.This calibration report shall not be reproduced, except in full.

Traceability Information: Measurements are traceable to the International System of Units (SI) via national metrology institutes (www.keysight.com/find/NMI) that are signatories to the CIPM Mutual Recognition Arrangement.

Uncertainty of Measurement

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. This probability corresponds to a coverage factor of k=2 for a normal distribution.

Print Date: 06-MAR-2022

Kang Chia Chiek
 Quality Manager

Keysight Technologies				
	DD	MM	YY	BY:
CAL	06	03	22	ZH
DUE				



Certificate of Calibration

ISO/IEC 17025:2017

Certificate No: 4524978-5592906-1

Calibration Equipment Used

<u>Model Number</u>	<u>Model Description</u>
---------------------	--------------------------

U8481A	USB Thermocouple Power Sensor
N4690D	N-TPYE 50 OHM ECAL MODULE
N5247B	PNA-X NETWORK ANALYZER
3458A	8-1/2 Digit Multimeter
N4690D	N-TPYE 50 OHM ECAL MODULE
N4690D	N-TPYE 50 OHM ECAL MODULE
3458A	8-1/2 Digit Multimeter
N4690D	N-TPYE 50 OHM ECAL MODULE
N4690D	N-TPYE 50 OHM ECAL MODULE

Date Used: Date equipment used in this calibration

<u>Equipment ID</u>	<u>Date Used</u>	<u>Cal Due Date</u>
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PB5590	06-MAR-2022	14-MAR-2022
PB5565	06-MAR-2022	01-AUG-2022
PB5729	06-MAR-2022	18-FEB-2023
P5744	06-MAR-2022	25-SEP-2022
PB5539	06-MAR-2022	27-JUN-2022
PB5100	06-MAR-2022	24-OCT-2022
P5160	06-MAR-2022	12-SEP-2022
PB5523	06-MAR-2022	20-MAR-2022
PB5101	06-MAR-2022	28-JUN-2022

Measurement Report

ISO/IEC 17025:2017

Report No: E5080BMY5920216020220306**Manufacturer:** Keysight Technologies
Model No: E5080B
Options Installed With Specifications: 290**Description:** Vector Network Analyzer
Serial No: MY59202160**Date of Calibration:** 06-MAR-2022
Temperature: (23 ± 3) °C
Procedure: ATM-09-Z7014,ATM-09-Z7015**Humidity:** (40 to 70) %RH

Compliance decision rule

The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:09/2019. If the expanded measurement uncertainty intervals centered about one or more measured values were both in as well as out of specification (upper or lower), it is not possible to state compliance or non-compliance based on a 95% coverage probability for the expanded measurement uncertainty.

An overall statement of compliance for all tests performed as received, and as completed (if any adjustments / repairs were performed) is included at the beginning of this report. Statements of compliance apply only to warranted specifications. When functional verification tests are performed, results are reported in the “Functional Test” section, and do not affect these statements of compliance.

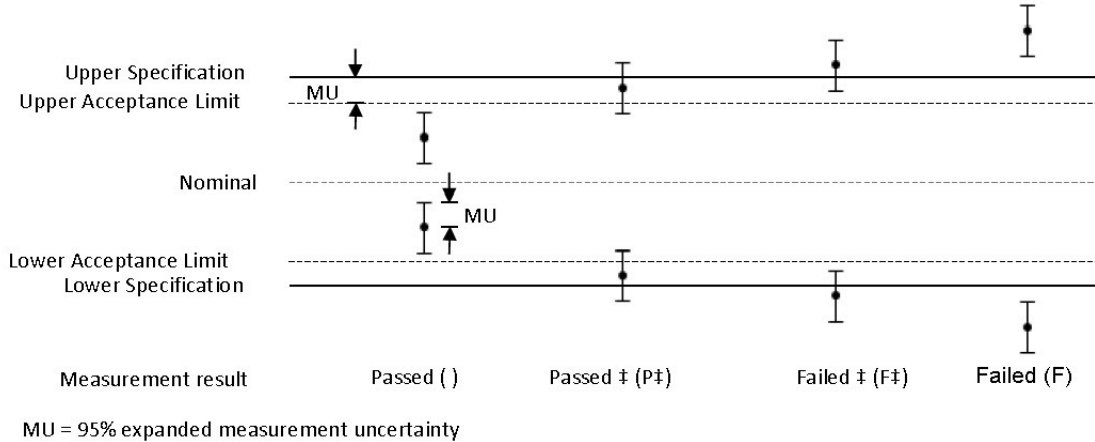
Measurement results are reported as:

- Passed () - The measured values of the equipment were observed in specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values were in specification.
- Passed ‡ (P‡) - The measured values of the equipment were observed in specification at the points tested. However, a portion of the expanded measurement uncertainty intervals about one or more measured values exceeded specification. Consequently, compliance with specification cannot be declared based on the stated coverage probability.
- Failed ‡ (F‡) - One or more measured values of the equipment were observed out of specification at the points tested. However, a portion of the expanded measurement uncertainty intervals about one or more measured values were in specification. Consequently, non-compliance with specification cannot be declared based on the stated coverage probability.
- Failed (F) - One or more measured values of the equipment were observed out of specification at the points tested. Additionally, the expanded measurement uncertainty intervals about one or more measured values were entirely outside the specification.

Measurement Report

ISO/IEC 17025:2017

Report No: E5080BMY5920216020220306



() This result is indicated on the measurement report as a blank space in the column labeled “Status” or “Sts”.

Note: For more information on the level of risk such as false accept and false reject and statistical assumptions of these statements of conformity, please visit: www.keysight.com/find/decisionrules

Acceptance Limit

The "Keysight Cal + Uncertainties + Guardbanding" service employs a guardband in the amount of the 95% expanded measurement uncertainty (MU). The resulting acceptance limit applied for Pass or Fail decisions, and for performing adjustments, is the difference of the specification and the guardband.

Uncertainty of Measurement

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. This probability corresponds to a coverage factor of k=2 for a normal distribution.

Measurement Report Summary

Calibration Test Results Summary

Calibration test results of warranted specifications

Test Name	As Completed Status
Frequency Accuracy	Passed
Power Level Accuracy	Passed
Power Level Linearity	Passed
Maximum Leveled Power	Passed
Noise Floor	Passed
Trace Noise, Transmission	Passed
Trace Noise, Reflection	Passed
Uncorrected Error Terms	Passed
Dynamic Accuracy - IF linearity	Passed
Dynamic Accuracy - Compression Level	Passed

Model No: E5080B
Serial No: MY59202160
Options installed: 290

Description: Vector Network Analyzer
Calibration Date: 06-MAR-2022

Frequency Accuracy

Passed

Frequency Accuracy - Port 1

Frequency [Hz]	Uncertainty [Hz]	Minimum	Test Result	Maximum	Status
1,000,000,000	210	-6790 Hz	-340 Hz	6790 Hz	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Power Level Accuracy

Passed

Power Level Accuracy - Power = 0 dBm / Stepped sweep mode / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	99,999	0.23	-3.77 dB	-0.17 dB	3.77 dB	
100,000	9,000,000,000	0.32	-1.18 dB	0.36 dB	1.18 dB	

Power Level Accuracy - Power = 0 dBm / Stepped sweep mode / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	99,999	0.23	-3.77 dB	0.12 dB	3.77 dB	
100,000	9,000,000,000	0.32	-1.18 dB	0.15 dB	1.18 dB	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Power Level Linearity

Passed

Power Level Linearity - Power = 10 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
10,000,000	6,500,000,000	0.26	-0.49 dB	-0.14 dB	0.49 dB	

Power Level Linearity - Power = 9 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
10,000,000	9,000,000,000	0.27	-0.48 dB	-0.1 dB	0.48 dB	

Power Level Linearity - Power = 7 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
10,000,000	9,000,000,000	0.27	-0.48 dB	-0.12 dB	0.48 dB	

Power Level Linearity - Power = 5 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
100,000	9,000,000,000	0.27	-0.48 dB	-0.13 dB	0.48 dB	

Power Level Linearity - Power = 4 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
100,000	9,000,000,000	0.27	-0.48 dB	-0.1 dB	0.48 dB	

Power Level Linearity - Power = 2.5 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
100,000	9,000,000,000	0.27	-0.48 dB	-0.1 dB	0.48 dB	

Power Level Linearity - Power = -2.5 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	0.05 dB	0.47 dB	

Power Level Linearity - Power = -5 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.27	-0.48 dB	0.03 dB	0.48 dB	

Power Level Linearity - Power = -7.5 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	0.06 dB	0.47 dB	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Power Level Linearity (cont.)

Power Level Linearity - Power = -10 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	0.05 dB	0.47 dB	

Power Level Linearity - Power = -12.5 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	0.06 dB	0.47 dB	

Power Level Linearity - Power = -15 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.29	-0.46 dB	0.06 dB	0.46 dB	

Power Level Linearity - Power = -17.5 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.29	-0.46 dB	0.1 dB	0.46 dB	

Power Level Linearity - Power = -20 dBm / Relative to 0 dBm reference / Port 1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	0.07 dB	0.47 dB	

Power Level Linearity - Power = 10 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
10,000,000	6,500,000,000	0.26	-0.49 dB	-0.14 dB	0.49 dB	

Power Level Linearity - Power = 9 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
10,000,000	9,000,000,000	0.27	-0.48 dB	-0.13 dB	0.48 dB	

Power Level Linearity - Power = 7 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
10,000,000	9,000,000,000	0.27	-0.48 dB	-0.13 dB	0.48 dB	

Power Level Linearity - Power = 5 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
100,000	9,000,000,000	0.27	-0.48 dB	-0.11 dB	0.48 dB	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Power Level Linearity (cont.)

Power Level Linearity - Power = 4 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
100,000	9,000,000,000	0.27	-0.48 dB	-0.14 dB	0.48 dB	

Power Level Linearity - Power = 2.5 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
100,000	9,000,000,000	0.27	-0.48 dB	-0.12 dB	0.48 dB	

Power Level Linearity - Power = -2.5 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	-0.05 dB	0.47 dB	

Power Level Linearity - Power = -5 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.27	-0.48 dB	0.03 dB	0.48 dB	

Power Level Linearity - Power = -7.5 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	0.06 dB	0.47 dB	

Power Level Linearity - Power = -10 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	0.05 dB	0.47 dB	

Power Level Linearity - Power = -12.5 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	0.07 dB	0.47 dB	

Power Level Linearity - Power = -15 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.29	-0.46 dB	0.07 dB	0.46 dB	

Power Level Linearity - Power = -17.5 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.29	-0.46 dB	0.07 dB	0.46 dB	

Model No: E5080B
Serial No: MY59202160
Options installed: 290

Description: Vector Network Analyzer
Calibration Date: 06-MAR-2022

Power Level Linearity (cont.)

Power Level Linearity - Power = -20 dBm / Relative to 0 dBm reference / Port 2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	9,000,000,000	0.28	-0.47 dB	0.09 dB	0.47 dB	

Model No: E5080B
Serial No: MY59202160
Options installed: 290

Description: Vector Network Analyzer
Calibration Date: 06-MAR-2022

Maximum Leveled Power

Passed

Maximum Leveled Power - Port 1					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Status
9,000	99,999	0.22	0.22 dBm	2.9 dBm	
100,000	9,999,999	0.21	5.21 dBm	7.81 dBm	
10,000,000	6,500,000,000	0.26	10.26 dBm	12.63 dBm	
6,500,000,001	9,000,000,000	0.28	9.28 dBm	12.61 dBm	

Maximum Leveled Power - Port 2					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Status
9,000	99,999	0.22	0.22 dBm	2.93 dBm	
100,000	9,999,999	0.21	5.21 dBm	7.86 dBm	
10,000,000	6,500,000,000	0.26	10.26 dBm	12.87 dBm	
6,500,000,001	9,000,000,000	0.28	9.28 dBm	12.34 dBm	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Noise Floor

Passed

Noise Floor - Port 1					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Test Result	Maximum	Status
9,000	99,999	4	-113 dBm	-105 dBm	
100,000	299,999	2.7	-122 dBm	-114.7 dBm	
300,000	999,999	2.7	-130.3 dBm	-122.7 dBm	
1,000,000	9,999,999	2.7	-136.3 dBm	-127.7 dBm	
10,000,000	49,999,999	2.2	-134.7 dBm	-129.2 dBm	
50,000,000	6,500,000,000	1.7	-134.6 dBm	-131.7 dBm	
6,500,000,001	9,000,000,000	1.7	-133.8 dBm	-128.7 dBm	

Noise Floor - Port 2					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Test Result	Maximum	Status
9,000	99,999	4	-114 dBm	-105 dBm	
100,000	299,999	2.7	-122.3 dBm	-114.7 dBm	
300,000	999,999	2.7	-128.6 dBm	-122.7 dBm	
1,000,000	9,999,999	2.7	-134.3 dBm	-127.7 dBm	
10,000,000	49,999,999	2.2	-134.6 dBm	-129.2 dBm	
50,000,000	6,500,000,000	1.7	-134.6 dBm	-131.7 dBm	
6,500,000,001	9,000,000,000	1.7	-133.8 dBm	-128.7 dBm	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Trace Noise, Transmission

Passed

Trace Noise, Transmission - Direction: S12 (Magnitude)					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB rms]	Test Result	Maximum	Status
9,000	29,999	0.00031	0.00097 dB rms	0.00469 dB rms	
30,000	99,999	0.00014	0.00044 dB rms	0.00286 dB rms	
100,000	6,000,000,000	0.00023	0.00057 dB rms	0.00127 dB rms	
6,000,000,001	9,000,000,000	0.00011	0.00052 dB rms	0.00189 dB rms	

Trace Noise, Transmission - Direction: S12 (Phase)					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [degree rms]	Test Result	Maximum	Status
9,000	29,999	0.0033	0.0136 degree rms	0.0667 degree rms	
30,000	99,999	0.0026	0.0095 degree rms	0.0474 degree rms	
100,000	299,999	0.00091	0.0031 degree rms	0.03409 degree rms	
300,000	6,000,000,000	0.00076	0.00251 degree rms	0.00924 degree rms	
6,000,000,001	9,000,000,000	0.0016	0.0031 degree rms	0.0184 degree rms	

Trace Noise, Transmission - Direction: S21 (Magnitude)					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB rms]	Test Result	Maximum	Status
9,000	29,999	0.00031	0.00096 dB rms	0.00469 dB rms	
30,000	99,999	0.00014	0.00053 dB rms	0.00286 dB rms	
100,000	6,000,000,000	0.00023	0.0007 dB rms	0.00127 dB rms	
6,000,000,001	9,000,000,000	0.00011	0.00052 dB rms	0.00189 dB rms	

Trace Noise, Transmission - Direction: S21 (Phase)					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [degree rms]	Test Result	Maximum	Status
9,000	29,999	0.0033	0.0142 degree rms	0.0667 degree rms	
30,000	99,999	0.0026	0.0091 degree rms	0.0474 degree rms	
100,000	299,999	0.00091	0.00287 degree rms	0.03409 degree rms	
300,000	6,000,000,000	0.00076	0.00365 degree rms	0.00924 degree rms	
6,000,000,001	9,000,000,000	0.0016	0.0027 degree rms	0.0184 degree rms	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Trace Noise, Reflection

Passed

Trace Noise, Reflection - Direction: S11 (Magnitude)					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB rms]	Test Result	Maximum	Status
9,000	29,999	0.00012	0.0005 dB rms	0.00488 dB rms	
30,000	99,999	0.000097	0.000442 dB rms	0.002903 dB rms	
100,000	6,000,000,000	0.00011	0.00058 dB rms	0.00139 dB rms	
6,000,000,001	9,000,000,000	0.00026	0.0005 dB rms	0.00174 dB rms	

Trace Noise, Reflection - Direction: S11 (Phase)					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [degree rms]	Test Result	Maximum	Status
9,000	29,999	0.0016	0.0026 degree rms	0.0684 degree rms	
30,000	99,999	0.00052	0.0024 degree rms	0.04948 degree rms	
100,000	299,999	0.00025	0.00091 degree rms	0.03475 degree rms	
300,000	6,000,000,000	0.00065	0.00315 degree rms	0.00935 degree rms	
6,000,000,001	9,000,000,000	0.0012	0.0032 degree rms	0.0188 degree rms	

Trace Noise, Reflection - Direction: S22 (Magnitude)					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB rms]	Test Result	Maximum	Status
9,000	29,999	0.00012	0.00051 dB rms	0.00488 dB rms	
30,000	99,999	0.000097	0.000509 dB rms	0.002903 dB rms	
100,000	6,000,000,000	0.00011	0.00058 dB rms	0.00139 dB rms	
6,000,000,001	9,000,000,000	0.00026	0.00059 dB rms	0.00174 dB rms	

Trace Noise, Reflection - Direction: S22 (Phase)					
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [degree rms]	Test Result	Maximum	Status
9,000	29,999	0.0016	0.0026 degree rms	0.0684 degree rms	
30,000	99,999	0.00052	0.00211 degree rms	0.04948 degree rms	
100,000	299,999	0.00025	0.00111 degree rms	0.03475 degree rms	
300,000	6,000,000,000	0.00065	0.00273 degree rms	0.00935 degree rms	
6,000,000,001	9,000,000,000	0.0012	0.0029 degree rms	0.0188 degree rms	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Uncorrected Error Terms

Passed

Uncorrected Error Terms - Correction: Off / System Correction: On / Port 1 / Receiver Gain: LOW						
System Performance	Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Test Result	Maximum	Status
Source Match	300,000	9,999,999	0.53	-47.83 dB	-20.53 dB	
Source Match	10,000,000	6,000,000,000	1.7	-49.6 dB	-26.7 dB	
Source Match	6,000,000,001	9,000,000,000	1	-46 dB	-21 dB	
Directivity	300,000	9,999,999	0.29	-47.41 dB	-20.29 dB	
Directivity	10,000,000	6,000,000,000	1	-49 dB	-26 dB	
Directivity	6,000,000,001	9,000,000,000	0.68	-41.6 dB	-20.68 dB	
Load Match	300,000	9,999,999	0.29	-30.54 dB	-15.29 dB	
Load Match	10,000,000	1,500,000,000	0.37	-23.65 dB	-17.37 dB	
Load Match	1,500,000,001	3,000,000,000	0.33	-20.61 dB	-16.33 dB	
Load Match	3,000,000,001	9,000,000,000	0.23	-15.95 dB	-11.23 dB	

Uncorrected Error Terms - Correction: Off / System Correction: On / Port 1 / Receiver Gain: HIGH						
System Performance	Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Test Result	Maximum	Status
Source Match	300,000	9,999,999	0.53	-59.31 dB	-20.53 dB	
Source Match	10,000,000	6,000,000,000	1.7	-48.9 dB	-26.7 dB	
Source Match	6,000,000,001	9,000,000,000	1	-47 dB	-21 dB	
Directivity	300,000	9,999,999	0.29	-57.91 dB	-20.29 dB	
Directivity	10,000,000	6,000,000,000	1	-48 dB	-26 dB	
Directivity	6,000,000,001	9,000,000,000	0.68	-43.54 dB	-20.68 dB	
Load Match	300,000	9,999,999	0.29	-30.61 dB	-15.29 dB	
Load Match	10,000,000	1,500,000,000	0.37	-24.06 dB	-17.37 dB	
Load Match	1,500,000,001	3,000,000,000	0.33	-20.56 dB	-16.33 dB	
Load Match	3,000,000,001	9,000,000,000	0.23	-16.22 dB	-11.23 dB	

Uncorrected Error Terms - Correction: Off / System Correction: On / Port 2 / Receiver Gain: LOW						
System Performance	Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Test Result	Maximum	Status
Source Match	300,000	9,999,999	0.53	-44.39 dB	-20.53 dB	
Source Match	10,000,000	6,000,000,000	1.7	-50 dB	-26.7 dB	
Source Match	6,000,000,001	9,000,000,000	1	-46 dB	-21 dB	
Directivity	300,000	9,999,999	0.29	-46 dB	-20.29 dB	
Directivity	10,000,000	6,000,000,000	1	-48 dB	-26 dB	
Directivity	6,000,000,001	9,000,000,000	0.68	-44.56 dB	-20.68 dB	
Load Match	300,000	9,999,999	0.29	-30.95 dB	-15.29 dB	
Load Match	10,000,000	1,500,000,000	0.37	-22.96 dB	-17.37 dB	
Load Match	1,500,000,001	3,000,000,000	0.33	-19.25 dB	-16.33 dB	
Load Match	3,000,000,001	9,000,000,000	0.23	-14.41 dB	-11.23 dB	

Uncorrected Error Terms - Correction: Off / System Correction: On / Port 2 / Receiver Gain: HIGH						
System Performance	Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Test Result	Maximum	Status
Source Match	300,000	9,999,999	0.53	-49.75 dB	-20.53 dB	
Source Match	10,000,000	6,000,000,000	1.7	-50.1 dB	-26.7 dB	
Source Match	6,000,000,001	9,000,000,000	1	-46 dB	-21 dB	
Directivity	300,000	9,999,999	0.29	-53.24 dB	-20.29 dB	
Directivity	10,000,000	6,000,000,000	1	-50 dB	-26 dB	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Uncorrected Error Terms (cont.)

Uncorrected Error Terms - Correction: Off / System Correction: On / Port 2 / Receiver Gain: HIGH						
System Performance	Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Test Result	Maximum	Status
Directivity	6,000,000,001	9,000,000,000	0.68	-44.05 dB	-20.68 dB	
Load Match	300,000	9,999,999	0.29	-31.12 dB	-15.29 dB	
Load Match	10,000,000	1,500,000,000	0.37	-23.29 dB	-17.37 dB	
Load Match	1,500,000,001	3,000,000,000	0.33	-19.13 dB	-16.33 dB	
Load Match	3,000,000,001	9,000,000,000	0.23	-15.14 dB	-11.23 dB	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Dynamic Accuracy - IF linearity

Passed

Dynamic Accuracy - IF linearity - Magnitude / Frequency = 30.6 MHz / T1					
Power Level [dBm]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
0	0.0058	-0.0349 dB	0.0057 dB	0.0349 dB	
-5	0.0052	-0.0206 dB	0.0031 dB	0.0206 dB	
-10	0.0044	-0.0156 dB	0.0011 dB	0.0156 dB	
-15	0.0030	-0.014 dB	0.0004 dB	0.014 dB	
-25	0.0031	-0.0136 dB	0.002 dB	0.0136 dB	
-30	0.0043	-0.0141 dB	0.0012 dB	0.0141 dB	
-35	0.0051	-0.0149 dB	-0.0004 dB	0.0149 dB	
-40	0.0059	-0.0157 dB	0.0011 dB	0.0157 dB	
-50	0.0077	-0.0171 dB	0.0027 dB	0.0171 dB	
-60	0.012	-0.021 dB	0.003 dB	0.021 dB	

Dynamic Accuracy - IF linearity - Magnitude / Frequency = 49.6 MHz / T1					
Power Level [dBm]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
0	0.0058	-0.0299 dB	0.0077 dB	0.0299 dB	
-5	0.0051	-0.0157 dB	0.0061 dB	0.0157 dB	
-10	0.0044	-0.0106 dB	0.0055 dB	0.0106 dB	
-15	0.0031	-0.0089 dB	0.0006 dB	0.0089 dB	
-25	0.0031	-0.0086 dB	-0.0003 dB	0.0086 dB	
-30	0.0045	-0.0089 dB	-0.0001 dB	0.0089 dB	
-35	0.0055	-0.0095 dB	0.0003 dB	0.0095 dB	
-40	0.0060	-0.0106 dB	0.0004 dB	0.0106 dB	
-50	0.0075	-0.0123 dB	0.0008 dB	0.0123 dB	
-60	0.012	-0.016 dB	0.004 dB	0.016 dB	

Dynamic Accuracy - IF linearity - Magnitude / Frequency = 99.6 MHz / T1					
Power Level [dBm]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
0	0.0056	-0.0301 dB	0.0019 dB	0.0301 dB	
-5	0.0051	-0.0157 dB	0.0011 dB	0.0157 dB	
-10	0.0045	-0.0105 dB	0.001 dB	0.0105 dB	
-15	0.0032	-0.0088 dB	-0.0001 dB	0.0088 dB	
-25	0.0031	-0.0086 dB	-0.0005 dB	0.0086 dB	
-30	0.0043	-0.0091 dB	0.0014 dB	0.0091 dB	
-35	0.0053	-0.0097 dB	0.0011 dB	0.0097 dB	
-40	0.0059	-0.0107 dB	0.0003 dB	0.0107 dB	
-50	0.0074	-0.0124 dB	-0.0001 dB	0.0124 dB	
-60	0.012	-0.016 dB	-0.001 dB	0.016 dB	

Dynamic Accuracy - IF linearity - Magnitude / Frequency = 30.6 MHz / T2					
Power Level [dBm]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
0	0.0058	-0.0349 dB	0.0031 dB	0.0349 dB	
-5	0.0052	-0.0206 dB	0.0011 dB	0.0206 dB	
-10	0.0044	-0.0156 dB	0.0007 dB	0.0156 dB	
-15	0.0030	-0.014 dB	0.0007 dB	0.014 dB	
-25	0.0031	-0.0136 dB	0.0022 dB	0.0136 dB	
-30	0.0043	-0.0141 dB	0.0017 dB	0.0141 dB	
-35	0.0051	-0.0149 dB	0.0036 dB	0.0149 dB	
-40	0.0059	-0.0157 dB	0.0018 dB	0.0157 dB	
-50	0.0077	-0.0171 dB	0.0043 dB	0.0171 dB	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Dynamic Accuracy - IF linearity (cont.)

Dynamic Accuracy - IF linearity - Magnitude / Frequency = 30.6 MHz / T2					
Power Level [dBm]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
-60	0.012	-0.021 dB	0.003 dB	0.021 dB	

Dynamic Accuracy - IF linearity - Magnitude / Frequency = 49.6 MHz / T2					
Power Level [dBm]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
0	0.0058	-0.0299 dB	0.0025 dB	0.0299 dB	
-5	0.0051	-0.0157 dB	0.0012 dB	0.0157 dB	
-10	0.0044	-0.0106 dB	0.0025 dB	0.0106 dB	
-15	0.0031	-0.0089 dB	0.0006 dB	0.0089 dB	
-25	0.0031	-0.0086 dB	0.0013 dB	0.0086 dB	
-30	0.0045	-0.0089 dB	0.0015 dB	0.0089 dB	
-35	0.0055	-0.0095 dB	0.0031 dB	0.0095 dB	
-40	0.0060	-0.0106 dB	0.0027 dB	0.0106 dB	
-50	0.0075	-0.0123 dB	0.0047 dB	0.0123 dB	
-60	0.012	-0.016 dB	0.009 dB	0.016 dB	

Dynamic Accuracy - IF linearity - Magnitude / Frequency = 99.6 MHz / T2					
Power Level [dBm]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
0	0.0056	-0.0301 dB	-0.004 dB	0.0301 dB	
-5	0.0051	-0.0157 dB	-0.0014 dB	0.0157 dB	
-10	0.0045	-0.0105 dB	-0.0008 dB	0.0105 dB	
-15	0.0032	-0.0088 dB	0.0006 dB	0.0088 dB	
-25	0.0031	-0.0086 dB	0.0001 dB	0.0086 dB	
-30	0.0043	-0.0091 dB	0.0001 dB	0.0091 dB	
-35	0.0053	-0.0097 dB	0.0001 dB	0.0097 dB	
-40	0.0059	-0.0107 dB	0.0015 dB	0.0107 dB	
-50	0.0074	-0.0124 dB	0.0006 dB	0.0124 dB	
-60	0.012	-0.016 dB	0 dB	0.016 dB	

Model No: E5080B
 Serial No: MY59202160
 Options installed: 290

Description: Vector Network Analyzer
 Calibration Date: 06-MAR-2022

Dynamic Accuracy - Compression Level

Passed

Dynamic Accuracy - Compression Level - Compression Input Power Level / Magnitude / T1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	99,999	0.043	-0.457 dB	0.024 dB	0.457 dB	
100,000	9,000,000,000	0.083	-0.117 dB	0.048 dB	0.117 dB	

Dynamic Accuracy - Compression Level - Compression Input Power Level / Phase / T1						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [degree]	Minimum	Test Result	Maximum	Status
9,000	99,999	0.29	-4.71 degree	-0.73 degree	4.71 degree	
100,000	9,000,000,000	0.54	-4.46 degree	-1.47 degree	4.46 degree	

Dynamic Accuracy - Compression Level - Compression Input Power Level / Magnitude / T2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [dB]	Minimum	Test Result	Maximum	Status
9,000	99,999	0.043	-0.457 dB	-0.014 dB	0.457 dB	
100,000	9,000,000,000	0.083	-0.117 dB	0.068 dB	0.117 dB	

Dynamic Accuracy - Compression Level - Compression Input Power Level / Phase / T2						
Start Frequency [Hz]	End Frequency [Hz]	Uncertainty [degree]	Minimum	Test Result	Maximum	Status
9,000	99,999	0.29	-4.71 degree	-0.44 degree	4.71 degree	
100,000	9,000,000,000	0.54	-4.46 degree	-1.49 degree	4.46 degree	

检测报告

编号: CANEC2201952008

日期: 2022年02月18日 第1页,共9页

客户名称: 福建紫金铜业有限公司
客户地址: 福建省上杭县南岗工业开发区

样品名称: 锡磷青铜: C5210
以上样品及信息由客户提供。

SGS工作编号: 22432719 - XM
样品接收日期: 2022年02月11日
检测周期: 2022年02月11日 - 2022年02月18日
检测要求: 根据客户要求检测
检测方法: 请参见下一页
检测结果: 请参见下一页

结论: 基于所送样品进行的检测, 镉、铅、汞、六价铬、多溴联苯(PBBs)、多溴二苯醚(PBDEs)、邻苯二甲酸酯(如邻苯二甲酸二丁酯(DBP)、邻苯二甲酸丁酯(BBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)和邻苯二甲酸二异丁酯(DIBP))的检测结果显示符合欧盟RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863的限值要求。

通标标准技术服务有限公司广州分公司
授权签名

陈江梨

Allie Chen陈江梨
批准签署人



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198 Kezhu Road, Sci-Tech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663
中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663

t (86-20) 82155555 www.sgs.com.cn
t (86-20) 82155555 sgs.china@sgs.com

检测报告

编号: CANEC2201952008

日期: 2022年02月18日 第2页,共9页

检测结果:

检测样品描述:

样品编号	SGS样品ID	描述
SN1	CAN22-019520.002	黄铜色金属

备注:

- (1) 1 mg/kg = 1 ppm = 0.0001%
- (2) MDL = 方法检测限
- (3) ND = 未检出 (< MDL)
- (4) "-" = 未规定

RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863

检测方法: 参考IEC 62321-4:2013+A1:2017, IEC 62321-5:2013, IEC 62321-7-1:2015, IEC 62321-6:2015 和 IEC 62321-8:2017, 采用 ICP-OES, UV-Vis 和 GC-MS 进行分析。

检测项目	限值	单位	MDL	002
镉 (Cd)	100	mg/kg	2	ND
铅 (Pb)	1,000	mg/kg	2	5
汞 (Hg)	1,000	mg/kg	2	ND
六价铬(Cr(VI))▼	-	µg/cm ²	0.10	ND
多溴联苯之和(PBBs)	1,000	mg/kg	-	ND
一溴联苯	-	mg/kg	5	ND
二溴联苯	-	mg/kg	5	ND
三溴联苯	-	mg/kg	5	ND
四溴联苯	-	mg/kg	5	ND
五溴联苯	-	mg/kg	5	ND
六溴联苯	-	mg/kg	5	ND
七溴联苯	-	mg/kg	5	ND
八溴联苯	-	mg/kg	5	ND
九溴联苯	-	mg/kg	5	ND
十溴联苯	-	mg/kg	5	ND
多溴二苯醚之和(PBDEs)	1,000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND
二溴二苯醚	-	mg/kg	5	ND
三溴二苯醚	-	mg/kg	5	ND
四溴二苯醚	-	mg/kg	5	ND
五溴二苯醚	-	mg/kg	5	ND



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SGS-CSTC 技术服务有限公司广州分公司
Guangzhou Branch / Technical Services Chemical Laboratory

198 Kezhu Road, Sci-Tech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663
中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663

t (86-20) 82155555 www.sgs.com.cn
t (86-20) 82155555 sgs.china@sgs.com

检测报告

编号: CANEC2201952008

日期: 2022年02月18日 第3页,共9页

检测项目	限值	单位	MDL	002
六溴二苯醚	-	mg/kg	5	ND
七溴二苯醚	-	mg/kg	5	ND
八溴二苯醚	-	mg/kg	5	ND
九溴二苯醚	-	mg/kg	5	ND
十溴二苯醚	-	mg/kg	5	ND
邻苯二甲酸二丁酯 (DBP)	1000	mg/kg	50	ND
邻苯二甲酸丁苄酯(BBP)	1000	mg/kg	50	ND
邻苯二甲酸二(2-乙基己基)酯(DEHP)	1000	mg/kg	50	ND
邻苯二甲酸二异丁酯(DIBP)	1000	mg/kg	50	ND

备注:

- (1)最大允许极限值引用自RoHS指令(EU) 2015/863。
- (2) IEC 62321 系列等同于 EN 62321 系列
https://www.cenelec.eu/dyn/www/?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25
- (3) ▼a. 当六价铬的浓度高于0.13 $\mu\text{g}/\text{cm}^2$ 时, 样品为阳性, 即含有六价铬;
 b. 当六价铬的浓度为ND(低于0.10 $\mu\text{g}/\text{cm}^2$)时, 样品为阴性, 即未检测到六价铬;
 c. 当六价铬的浓度介于0.10 $\mu\text{g}/\text{cm}^2$ 与0.13 $\mu\text{g}/\text{cm}^2$ 之间时, 无法直接判定是否检测到六价铬, 因不同个体的样品表面差异可能会影响测定结果;
 由于未获知样品的存储条件和生产日期, 样品的六价铬检测结果仅能代表检测时样品含六价铬的状态。

卤素

检测方法: 参考EN 14582:2016, 用 IC分析。

检测项目	单位	MDL	002
氟 (F)	mg/kg	50	ND
氯 (Cl)	mg/kg	50	ND
溴 (Br)	mg/kg	50	ND
碘 (I)	mg/kg	50	ND

元素分析

检测方法: SGS内部方法 (GZTC CHEM-TOP-009-01, 参考EPA 3050B:1996), 采用ICP-OES进行分析。



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检测报告

编号: CANEC2201952008

日期: 2022年02月18日 第4页,共9页

检测项目	单位	MDL	002
锑 (Sb)	mg/kg	10	ND
铍 (Be)	mg/kg	5	ND

除非另有说明, 此报告结果仅对检测的样品负责。本报告未经本公司书面许可, 不可部分复制。检测报告仅用于客户科研、教学、内部质量控制、产品研发等目的, 仅供内部参考。



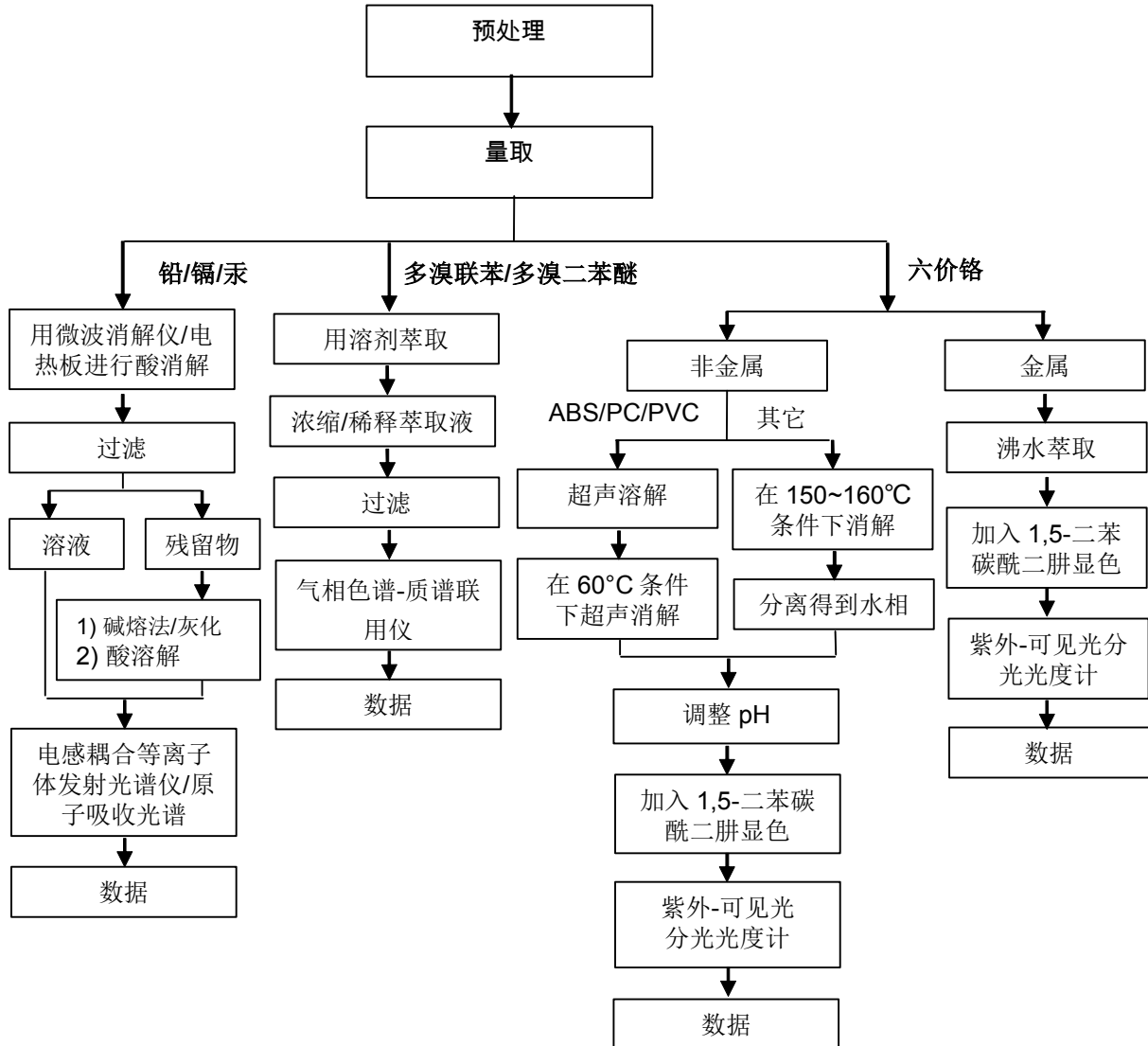
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附件

Pb/Cd/Hg/Cr⁶⁺/PBBs/PBDEs 测试流程图

1) 样品按照下述流程被完全消解（六价铬和多溴联苯/多溴二苯醚测试除外）。



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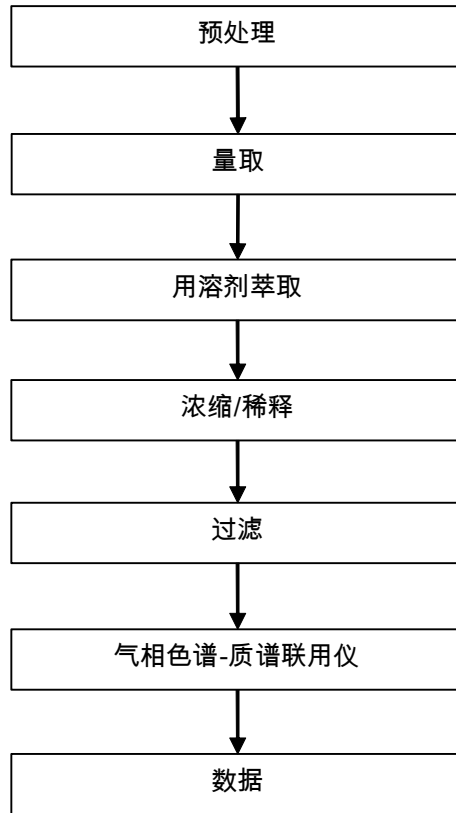
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附件

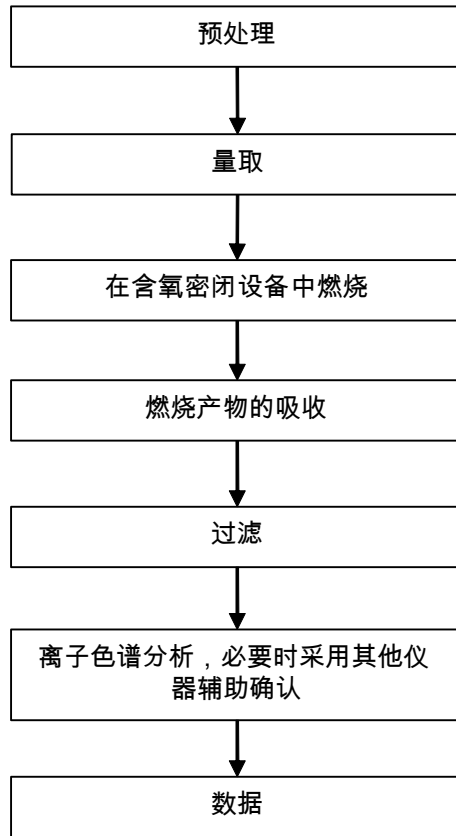
Phthalates 测试流程图



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附件

Halogen 测试流程图

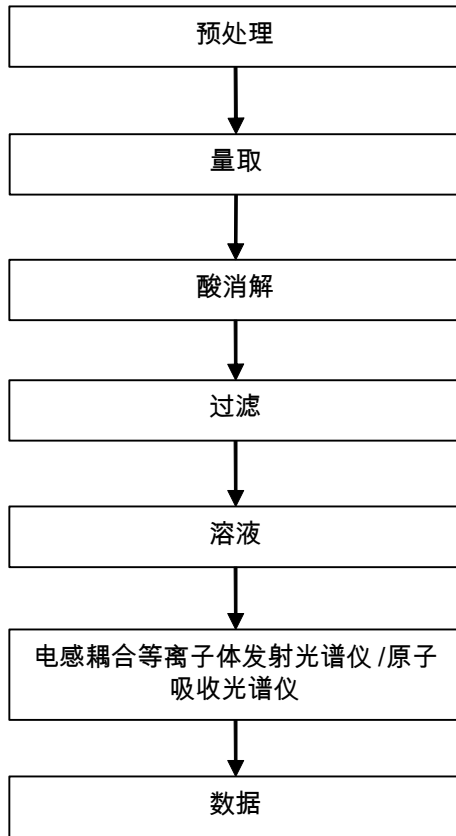


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附件

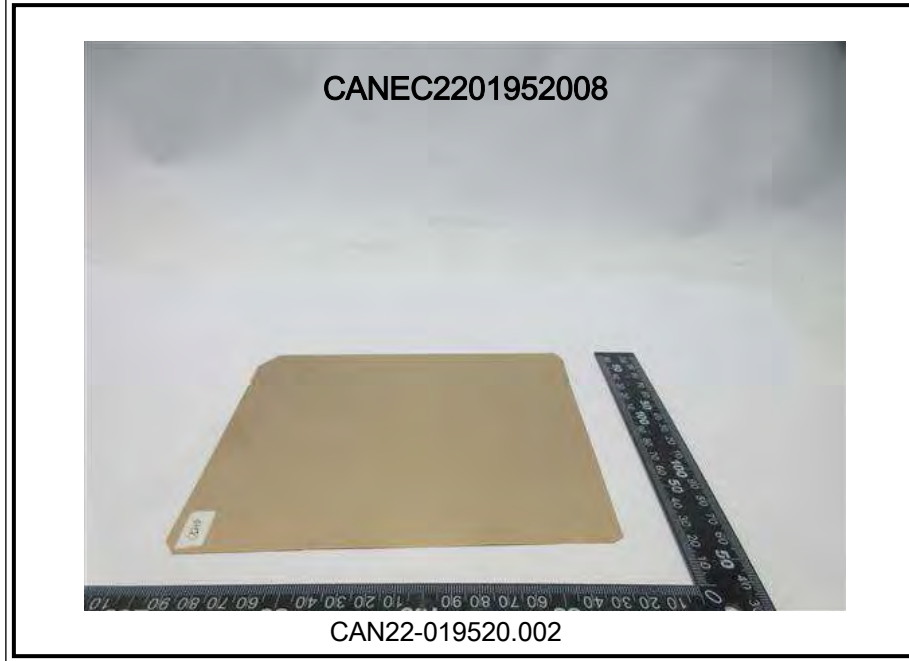
元素测试流程图



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*** 报告完 ***



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Test Report

No.: ETR22800749

Date: 10-Aug-2022

Page: 1 of 12

SHINKONG SYNTHETIC FIBERS CORPORATION
SHINKONG APPLIED MATERIALS (JIANGSU) COMPANY LIMITED
LOTUS BUILDING, 5F, NO.136, SEC.3, REN AI ROAD, DA AN DISTRICT, TAIPEI CITY 10657, TAIWAN
NO.1, HUAFA ROAD, TANGZHOU ECONOMIC AND TECHNOLOGICAL DEVELOPMENT ZONE, YANGZHOU
JIANGSU, CHINA

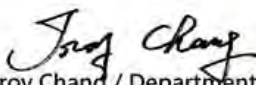
The following sample(s) was/were submitted and identified by the applicant as:

Sample Submitted By : SHINKONG SYNTHETIC FIBERS CORPORATION
Sample Name : THERMOPLASTIC POLYESTER RESIN
Style/Item No. : SHINITE ® PBT D201G10BK, D201G15BK, D201G20BK, D201G30BK

=====
Sample Receiving Date : 03-Aug-2022
Testing Period : 03-Aug-2022 to 10-Aug-2022

Test Requested : Testing item(s) is/are specified by client. Please refer to result table for testing item(s).

Test Results : Please refer to following pages.


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



PIN CODE: 64821485

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Test Report

No.: ETR22800749

Date: 10-Aug-2022

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 NO.1, HUAFA ROAD, TANGZHOU ECONOMIC AND TECHNOLOGICAL DEVELOPMENT ZONE, YANGZHOU
 JIANGSU, CHINA

Test Part Description

No.1 : MIXED ALL BLACK PLASTIC PELLETS

Test Result(s)

Test Item(s)	Method	Unit	MDL	Result
				No.1
Cadmium (Cd) (CAS No.: 7440-43-9)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.
Lead (Pb) (CAS No.: 7439-92-1)		mg/kg	2	4.47
Mercury (Hg) (CAS No.: 7439-97-6)	With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.	mg/kg	2	n.d.
Hexavalent Chromium Cr(VI) (CAS No.: 18540-29-9)	With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.	mg/kg	8	n.d.
Monobromobiphenyl	With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.	mg/kg	5	n.d.
Dibromobiphenyl		mg/kg	5	n.d.
Tribromobiphenyl		mg/kg	5	n.d.
Tetrabromobiphenyl		mg/kg	5	n.d.
Pentabromobiphenyl		mg/kg	5	n.d.
Hexabromobiphenyl		mg/kg	5	n.d.
Heptabromobiphenyl		mg/kg	5	n.d.
Octabromobiphenyl		mg/kg	5	n.d.
Nonabromobiphenyl		mg/kg	5	n.d.
Decabromobiphenyl		mg/kg	5	n.d.
Sum of PBBs		mg/kg	-	n.d.
Monobromodiphenyl ether		mg/kg	5	n.d.
Dibromodiphenyl ether		mg/kg	5	n.d.
Tribromodiphenyl ether		mg/kg	5	n.d.
Tetrabromodiphenyl ether		mg/kg	5	n.d.
Pentabromodiphenyl ether		mg/kg	5	n.d.
Hexabromodiphenyl ether		mg/kg	5	n.d.
Heptabromodiphenyl ether		mg/kg	5	n.d.
Octabromodiphenyl ether		mg/kg	5	n.d.
Nonabromodiphenyl ether		mg/kg	5	n.d.
Decabromodiphenyl ether	mg/kg	5	n.d.	
Sum of PBDEs	mg/kg	-	n.d.	

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Test Report

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Date: 10-Aug-2022

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 JIANGSU, CHINA

Test Item(s)	Method	Unit	MDL	Result
				No.1
Butyl benzyl phthalate (BBP) (CAS No.: 85-68-7)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Dibutyl phthalate (DBP) (CAS No.: 84-74-2)		mg/kg	50	n.d.
Di-(2-ethylhexyl) phthalate (DEHP) (CAS No.: 117-81-7)		mg/kg	50	n.d.
Diisobutyl phthalate (DIBP) (CAS No.: 84-69-5)		mg/kg	50	n.d.
Diisodecyl phthalate (DIDP) (CAS No.: 26761-40-0, 68515-49-1)		mg/kg	50	n.d.
Diisononyl phthalate (DINP) (CAS No.: 28553-12-0, 68515-48-0)		mg/kg	50	n.d.
Di-n-octyl phthalate (DNOP) (CAS No.: 117-84-0)		mg/kg	50	n.d.
Diundecyl phthalate (DUP) (CAS No.: 3648-20-2)		mg/kg	50	n.d.
Di-n-pentyl phthalate (DNPP) (CAS No.: 131-18-0)		mg/kg	50	n.d.
Bis(2-methoxyethyl) phthalate (DMEP) (CAS No.: 117-82-8)		mg/kg	50	n.d.
Dipropylheptyl phthalate (CAS No.: 53306-54-0)	mg/kg	50	n.d.	
Di-n-hexyl phthalate (DNHP) (CAS No.: 84-75-3)	mg/kg	50	n.d.	
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))	With reference to IEC 62321-9: 2021, analysis was performed by GC/MS.	mg/kg	20	n.d.

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Test Report

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 JIANGSU, CHINA

Test Item(s)	Method	Unit	MDL	Result
				No.1
Chlorine (Cl) (CAS No.: 22537-15-1)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	127
Bromine (Br) (CAS No.: 10097-32-2)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.
Medium Chain Chlorinated Paraffins(C14-C17) (MCCP) (CAS No.: 85535-85-9)	With reference to ISO 18219: 2015, analysis was performed by GC/MS.	mg/kg	50	n.d.
Tetrabromobisphenol A (TBBP-A) (CAS No.: 79-94-7)	With reference to RSTS-E&E-121, analysis was performed by LC/MS.	mg/kg	10	n.d.

Note :

1. mg/kg = ppm ; 0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected (Less than MDL)
4. "-" = Not Regulated
5. The sample(s) was/were analyzed on behalf of the applicant as mixing sample in one testing. The above result(s) was/were only given as the informality value.

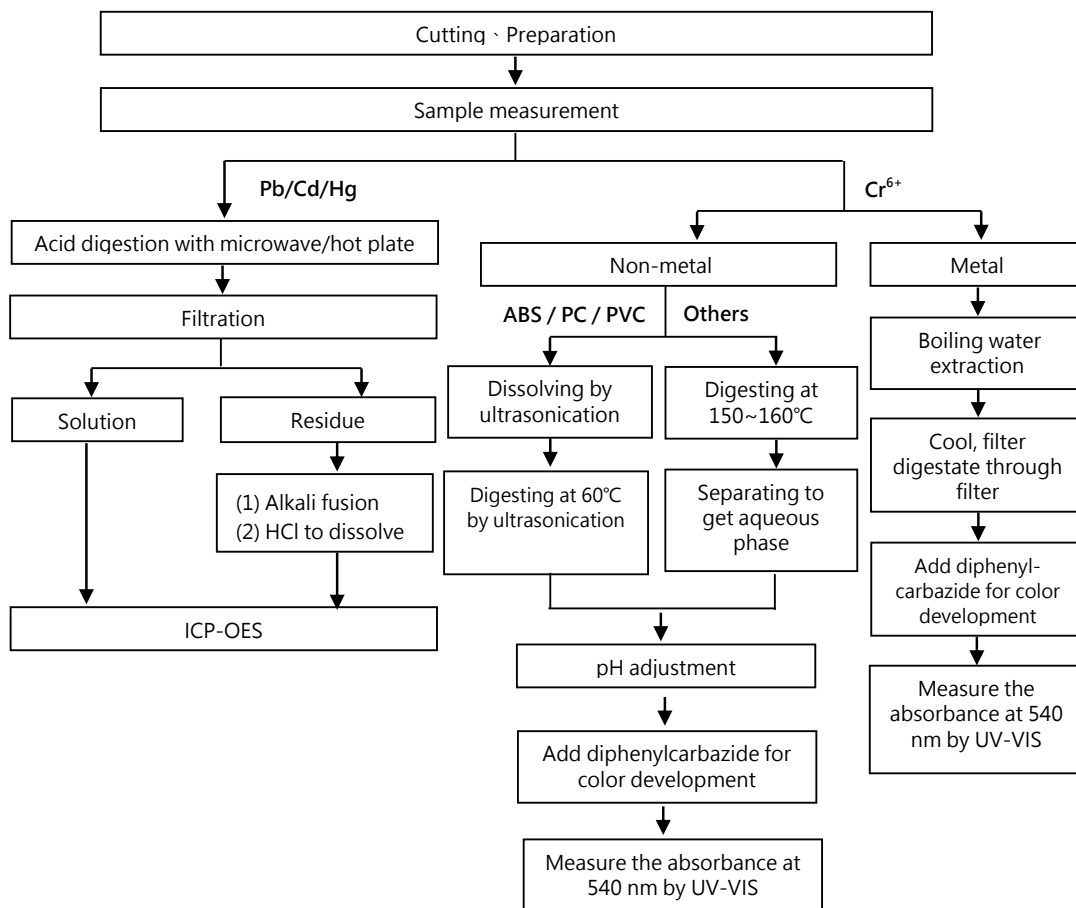
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SHINKONG SYNTHETIC FIBERS CORPORATION
 SHINKONG APPLIED MATERIALS (JIANGSU) COMPANY LIMITED
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 NO.1, HUAFA ROAD, TANGZHOU ECONOMIC AND TECHNOLOGICAL DEVELOPMENT ZONE, YANGZHOU
 JIANGSU, CHINA

Analytical flow chart of Heavy Metal

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

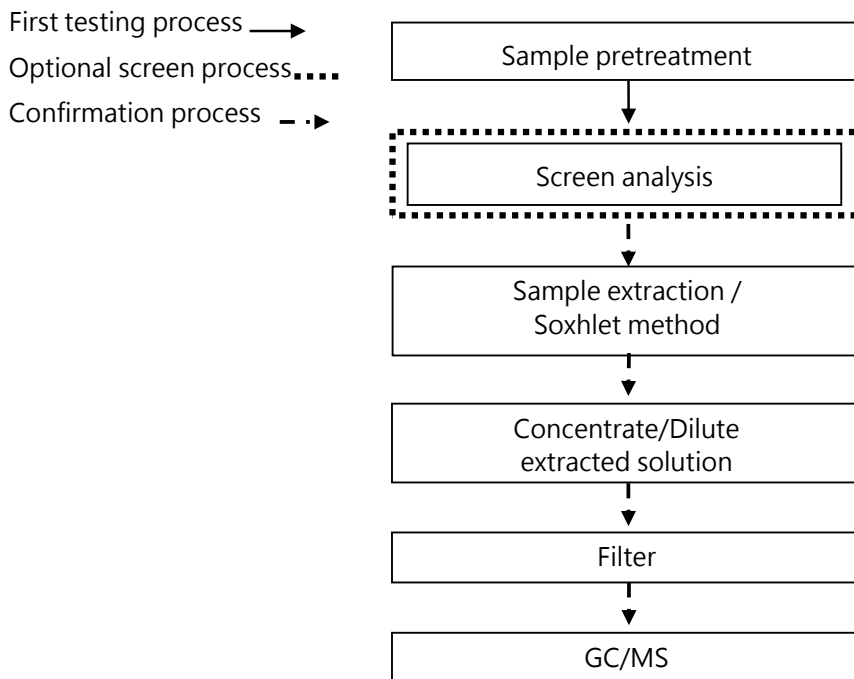
(Cr⁶⁺ test method excluded)



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Analytical flow chart – PBBs / PBDEs

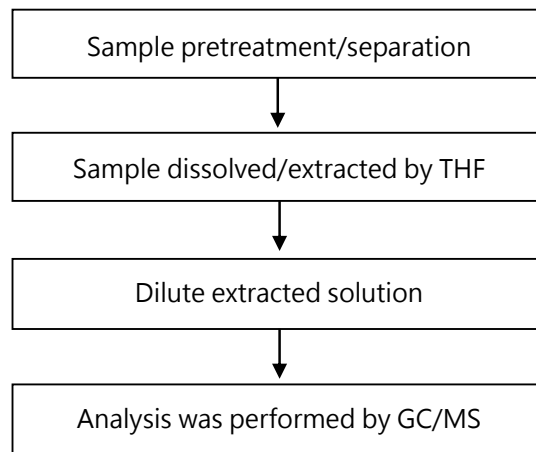


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Analytical flow chart - Phthalate

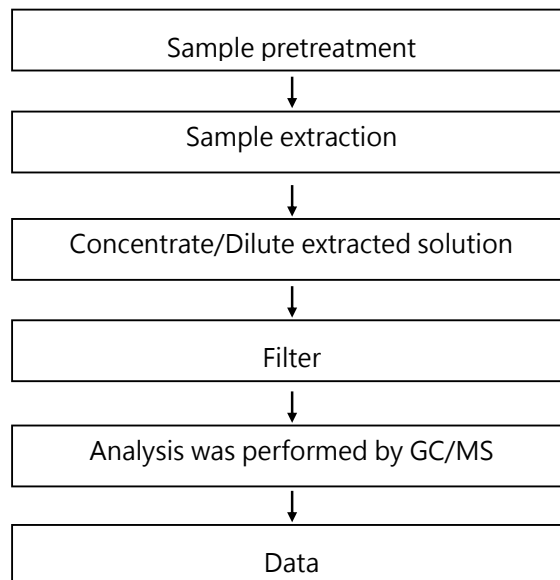
【Test method: IEC 62321-8】



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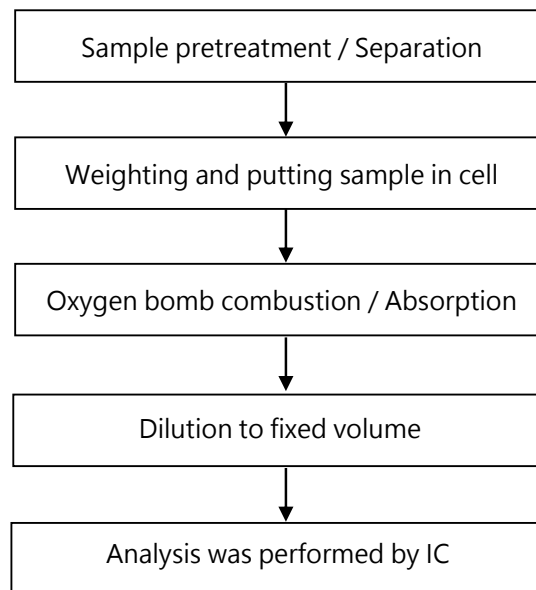
Analytical flow chart - HBCDD



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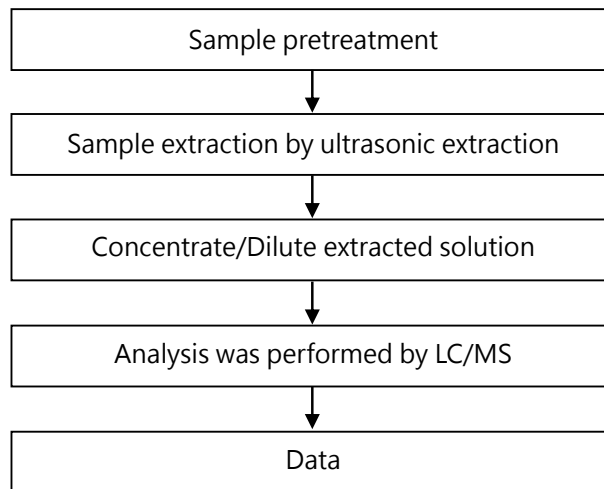
Analytical flow chart - Halogen



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Analytical flow chart - TBBP-A

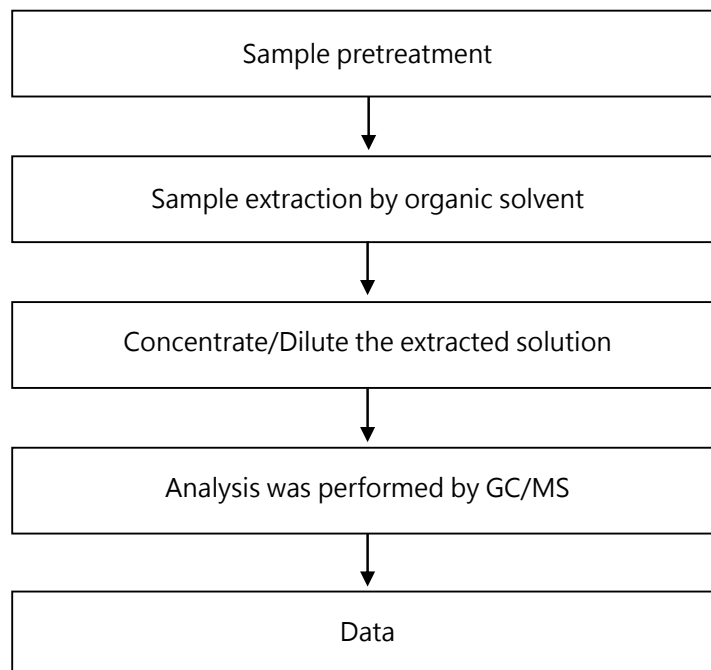


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Analytical flow chart

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



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Test Report

No.: ETR22800749

Date: 10-Aug-2022

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LOTUS BUILDING, 5F, NO.136, SEC.3, REN AI ROAD, DA AN DISTRICT, TAIPEI CITY 10657, TAIWAN
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* The tested sample / part is marked by an arrow if it's shown on the photo. *

ETR22800749



** End of Report **

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检测报告



报告编号 A2220404860101002C

第 1 页 共 8 页

报告抬头公司名称 翊腾电子科技(昆山)有限公司
地 址 江苏省昆山开发区大通路1575号

以下测试之样品及样品信息由申请者提供并确认

样品名称 镍镀层
样品接收日期 2022.09.09
样品检测日期 2022.09.09-2022.09.17

检测要求 根据客户要求, 对所提交样品中的铅(Pb), 镉(Cd), 汞(Hg), 六价铬(Cr(VI)), 多溴联苯(PBBs), 多溴二苯醚(PBDEs), 邻苯二甲酸酯(DBP, BBP, DEHP, DIBP), 铍(Be), 锑(Sb), 六溴环十二烷(HBCDD), 氟(F), 氯(Cl), 溴(Br), 碘(I), 全氟辛酸磺酸(PFOS), 全氟辛酸(PFOA)进行测试。

检测依据 请参见下页。

检测结果 请参见下页。

结论

测试样品	依据标准/指令	结果
提交样品	欧盟RoHS指令2011/65/EU及其修订指令(EU) 2015/863	符合

符合表示检测结果满足欧盟RoHS指令2011/65/EU及其修订指令(EU) 2015/863要求的限值。



张孝瑜

陈凯敏

陈凯敏

实验室经理

审 核

顾翠丽

日 期

2022.09.17

No. R188384580

上海市闵行区万芳路1351号

检测报告

报告编号 A2220404860101002C

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检测依据

测试项目	测试方法	测试仪器
铅(Pb)	参考IEC 62321-5:2013	ICP-OES
镉(Cd)	参考IEC 62321-5:2013	ICP-OES
汞(Hg)	参考IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES
六价铬(Cr(VI))	IEC 62321-7-1:2015	UV-Vis
多溴联苯(PBBs)	IEC 62321-6:2015	GC-MS
多溴二苯醚(PBDEs)	IEC 62321-6:2015	GC-MS
邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS
铍(Be)	参考US EPA 3050B:1996 & US EPA 6010D:2018*	ICP-OES
锑(Sb)	参考US EPA 3050B:1996 & US EPA 6010D:2018*	ICP-OES
六溴环十二烷(HBCDD)	IEC 62321-9:2021*	GC-MS
氟(F)	参考EN 14582:2016*	IC
氯(Cl)	参考EN 14582:2016*	IC
溴(Br)	参考EN 14582:2016*	IC
碘(I)	参考EN 14582:2016*	IC
全氟辛烷磺酸(PFOS)	参考US EPA 3550C:2007 & US EPA 8321B:2007*	LC-MS-MS/LC-MS
全氟辛酸(PFOA)	参考US EPA 3550C:2007 & US EPA 8321B:2007*	LC-MS-MS/LC-MS

检测报告

报告编号 A2220404860101002C

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检测结果

测试项目	结果	方法检出限	限值
铅(Pb)	N.D.	2 mg/kg	1000 mg/kg
镉(Cd)	N.D.	2 mg/kg	100 mg/kg
汞(Hg)	N.D.	2 mg/kg	1000 mg/kg
六价铬(Cr(VI))	N.D. ▼	0.10 μg/cm ² (LOQ)	1000 mg/kg

测试项目	结果	方法检出限	限值
多溴联苯(PBBs)			
一溴联苯	N.D.	5 mg/kg	1000 mg/kg
二溴联苯	N.D.	5 mg/kg	
三溴联苯	N.D.	5 mg/kg	
四溴联苯	N.D.	5 mg/kg	
五溴联苯	N.D.	5 mg/kg	
六溴联苯	N.D.	5 mg/kg	
七溴联苯	N.D.	5 mg/kg	
八溴联苯	N.D.	5 mg/kg	
九溴联苯	N.D.	5 mg/kg	
十溴联苯	N.D.	5 mg/kg	

测试项目	结果	方法检出限	限值
多溴二苯醚(PBDEs)			
一溴二苯醚	N.D.	5 mg/kg	1000 mg/kg
二溴二苯醚	N.D.	5 mg/kg	
三溴二苯醚	N.D.	5 mg/kg	
四溴二苯醚	N.D.	5 mg/kg	
五溴二苯醚	N.D.	5 mg/kg	
六溴二苯醚	N.D.	5 mg/kg	
七溴二苯醚	N.D.	5 mg/kg	
八溴二苯醚	N.D.	5 mg/kg	
九溴二苯醚	N.D.	5 mg/kg	
十溴二苯醚	N.D.	5 mg/kg	

检测报告

报告编号 A2220404860101002C

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检测结果

测试项目	结果	方法检出限	限值
邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)			
邻苯二甲酸二丁酯(DBP) CAS#:84-74-2	N.D.	50 mg/kg	1000 mg/kg
邻苯二甲酸丁基苄基酯(BBP) CAS#:85-68-7	N.D.	50 mg/kg	1000 mg/kg
邻苯二甲酸二(2-乙基)己酯(DEHP) CAS#:117-81-7	N.D.	50 mg/kg	1000 mg/kg
邻苯二甲酸二异丁酯(DIBP) CAS#:84-69-5	N.D.	50 mg/kg	1000 mg/kg

测试项目	结果	方法检出限
铍(Be)	N.D.	10 mg/kg
锑(Sb)	N.D.	10 mg/kg

测试项目	结果	方法检出限
六溴环十二烷(HBCDD)	N.D.	20 mg/kg

测试项目	结果	方法检出限
氟(F)	N.D.	1 µg/cm ²
氯(Cl)	N.D.	1 µg/cm ²
溴(Br)	N.D.	1 µg/cm ²
碘(I)	N.D.	1 µg/cm ²

测试项目	结果	方法检出限
全氟辛烷磺酸(PFOS)	N.D.	0.5 µg/m ²

测试项目	结果	方法检出限
全氟辛酸(PFOA)	N.D.	0.5 µg/m ²

样品/部位描述 银色镀层

备注： 对于检测铅，镉，汞，铍，锑之样品已消解完全。

-N.D. = 未检出 (小于方法检出限或定量限)

-mg/kg = ppm = 百万分之一

-1000 mg/kg = 0.1%

-LOQ = 定量限，六价格的定量限为0.10 µg/cm²

-▼六价格浓度小于0.10 µg/cm²，样品未检出六价格

注释： 本报告中的数据结果供科研、教学、企业内部质量控制、企业产品研发等目的用。

“*”表示该方法不在CNAS 认可范围内。

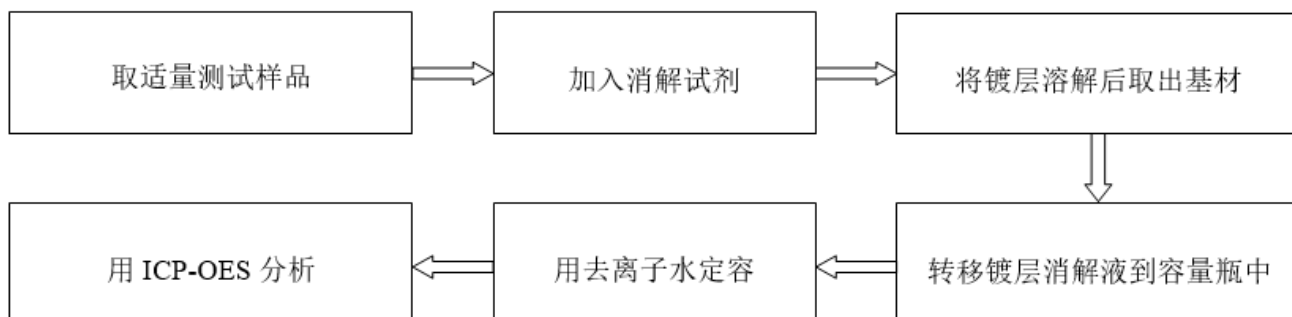
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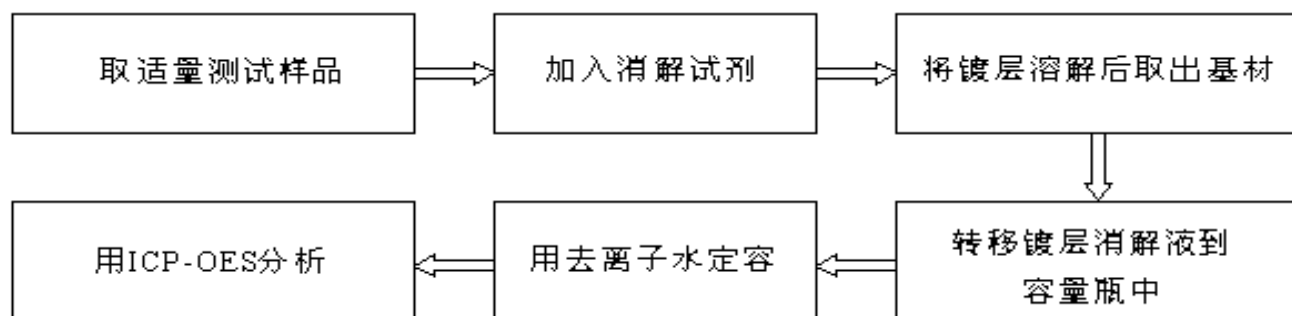
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检测流程

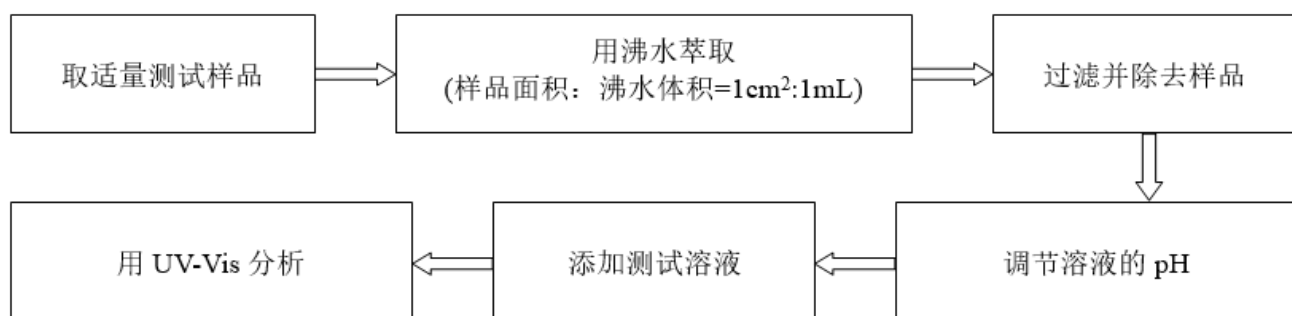
1. 铅(Pb), 镉(Cd)



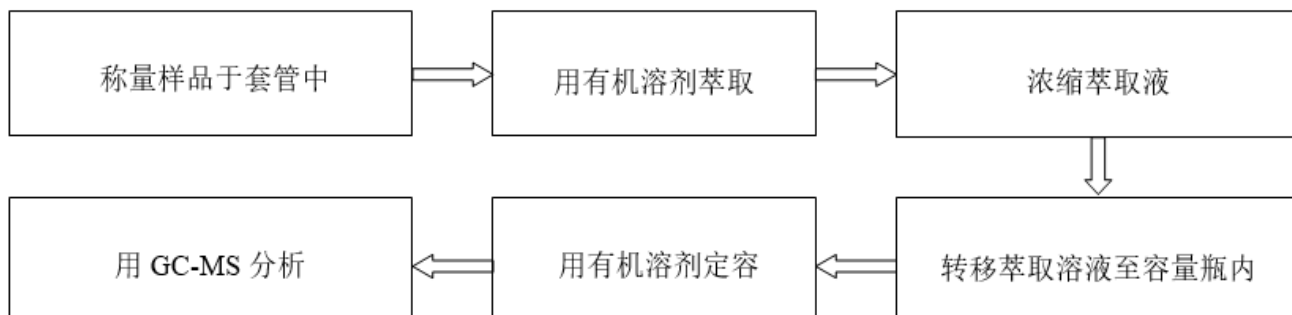
2. 汞(Hg)



3. 六价铬(Cr(VI))



4. 多溴联苯(PBBs), 多溴二苯醚(PBDEs)

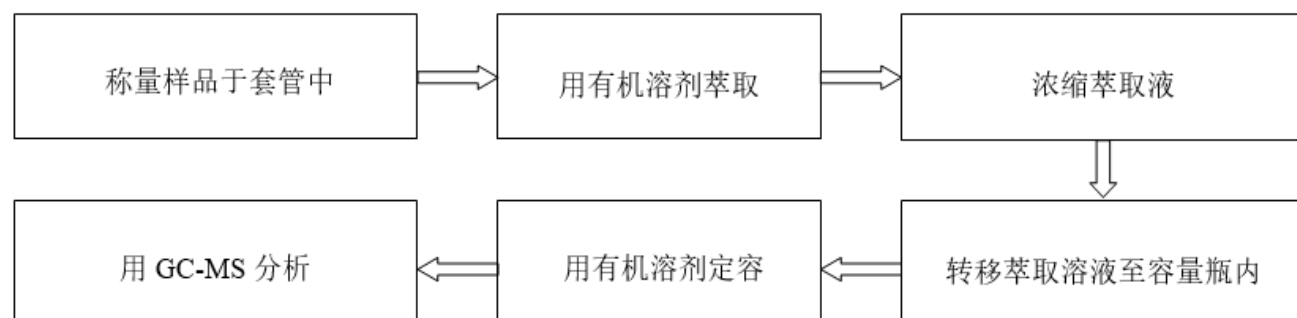


检测报告

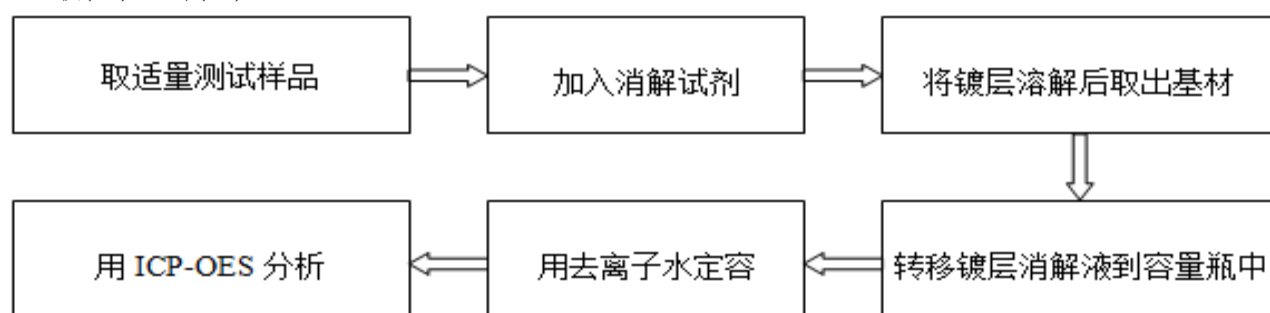
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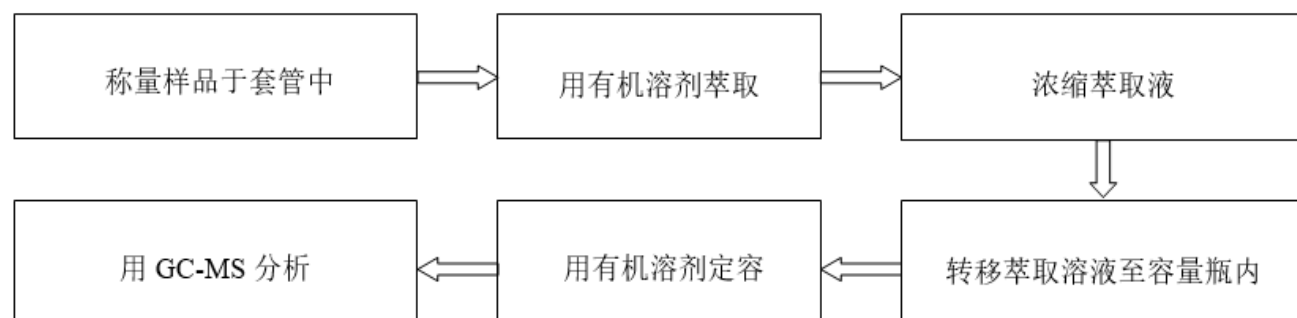
5. 邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)



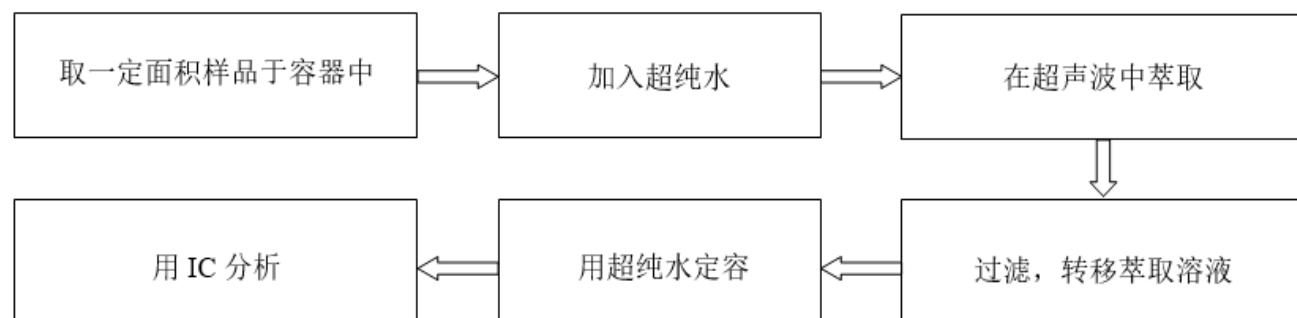
6. 铍(Be), 锑(Sb)



7. 六溴环十二烷(HBCDD)



8. 氟(F), 氯(Cl), 溴(Br), 碘(I)

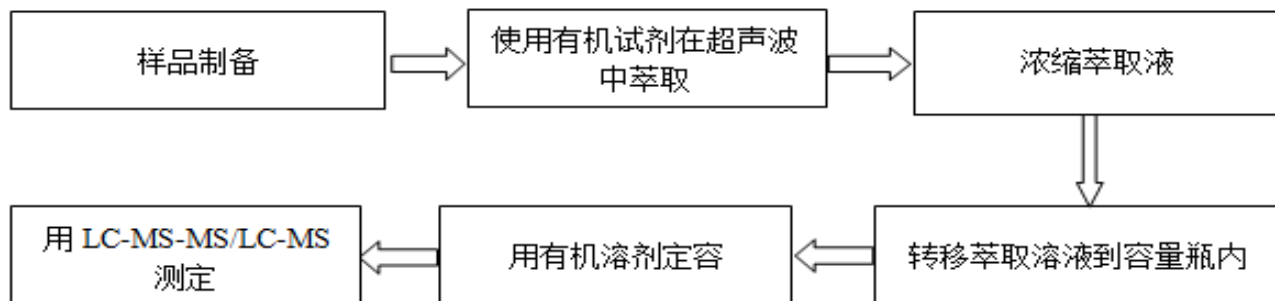


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9. 全氟辛烷磺酸(PFOS), 全氟辛酸(PFOA)

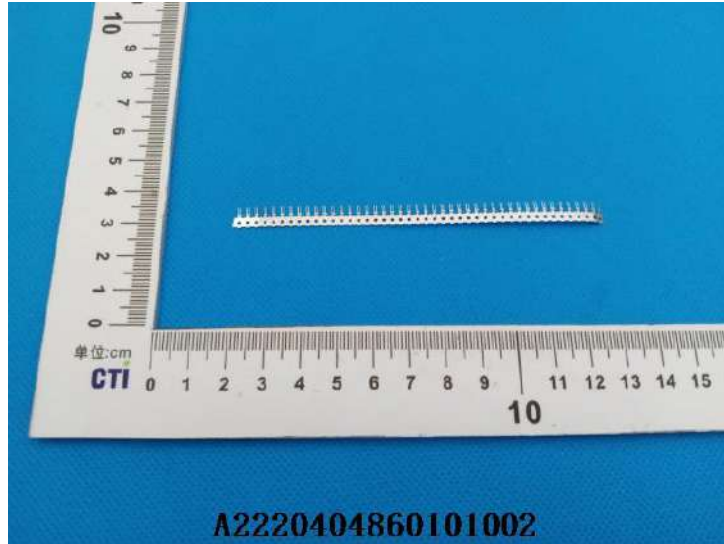


检测报告

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样品图片



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3. 本报告检测结果仅对受测样品负责;
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*** 报告结束 ***



检测报告

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第 1 页 共 8 页

报告抬头公司名称 翊腾电子科技(昆山)有限公司
地 址 江苏省昆山开发区大通路1575号

以下测试之样品及样品信息由申请者提供并确认

样品名称 金镀层
样品接收日期 2022.09.09
样品检测日期 2022.09.09-2022.09.17

检测要求 根据客户要求, 对所提交样品中的铅(Pb), 镉(Cd), 汞(Hg), 六价铬(Cr(VI)), 多溴联苯(PBBs), 多溴二苯醚(PBDEs), 邻苯二甲酸酯(DBP, BBP, DEHP, DIBP), 铍(Be), 锑(Sb), 六溴环十二烷(HBCDD), 氟(F), 氯(Cl), 溴(Br), 碘(I), 全氟辛酸磺酸(PFOS), 全氟辛酸(PFOA)进行测试。

检测依据 请参见下页。

检测结果 请参见下页。

结论

测试样品	依据标准/指令	结果
提交样品	欧盟RoHS指令2011/65/EU及其修订指令(EU) 2015/863	符合

符合表示检测结果满足欧盟RoHS指令2011/65/EU及其修订指令(EU) 2015/863要求的限值。



张孝瑜
陈凯敏
陈凯敏
实验室经理

审 核
日 期

顾翠丽
2022.09.17

No. R188384580

上海市闵行区万芳路1351号

检测报告

报告编号 A2220404860101001C

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检测依据

测试项目	测试方法	测试仪器
铅(Pb)	参考IEC 62321-5:2013	ICP-OES
镉(Cd)	参考IEC 62321-5:2013	ICP-OES
汞(Hg)	参考IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES
六价铬(Cr(VI))	IEC 62321-7-1:2015	UV-Vis
多溴联苯(PBBs)	IEC 62321-6:2015	GC-MS
多溴二苯醚(PBDEs)	IEC 62321-6:2015	GC-MS
邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS
铍(Be)	参考US EPA 3050B:1996 & US EPA 6010D:2018*	ICP-OES
锑(Sb)	参考US EPA 3050B:1996 & US EPA 6010D:2018*	ICP-OES
六溴环十二烷(HBCDD)	IEC 62321-9:2021*	GC-MS
氟(F)	参考EN 14582:2016*	IC
氯(Cl)	参考EN 14582:2016*	IC
溴(Br)	参考EN 14582:2016*	IC
碘(I)	参考EN 14582:2016*	IC
全氟辛烷磺酸(PFOS)	参考US EPA 3550C:2007 & US EPA 8321B:2007*	LC-MS-MS/LC-MS
全氟辛酸(PFOA)	参考US EPA 3550C:2007 & US EPA 8321B:2007*	LC-MS-MS/LC-MS

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检测结果

测试项目	结果	方法检出限	限值
铅(Pb)	N.D.	2 mg/kg	1000 mg/kg
镉(Cd)	N.D.	2 mg/kg	100 mg/kg
汞(Hg)	N.D.	2 mg/kg	1000 mg/kg
六价铬(Cr(VI))	N.D. ▼	0.10 μg/cm ² (LOQ)	1000 mg/kg

测试项目	结果	方法检出限	限值
多溴联苯(PBBs)			
一溴联苯	N.D.	5 mg/kg	1000 mg/kg
二溴联苯	N.D.	5 mg/kg	
三溴联苯	N.D.	5 mg/kg	
四溴联苯	N.D.	5 mg/kg	
五溴联苯	N.D.	5 mg/kg	
六溴联苯	N.D.	5 mg/kg	
七溴联苯	N.D.	5 mg/kg	
八溴联苯	N.D.	5 mg/kg	
九溴联苯	N.D.	5 mg/kg	
十溴联苯	N.D.	5 mg/kg	

测试项目	结果	方法检出限	限值
多溴二苯醚(PBDEs)			
一溴二苯醚	N.D.	5 mg/kg	1000 mg/kg
二溴二苯醚	N.D.	5 mg/kg	
三溴二苯醚	N.D.	5 mg/kg	
四溴二苯醚	N.D.	5 mg/kg	
五溴二苯醚	N.D.	5 mg/kg	
六溴二苯醚	N.D.	5 mg/kg	
七溴二苯醚	N.D.	5 mg/kg	
八溴二苯醚	N.D.	5 mg/kg	
九溴二苯醚	N.D.	5 mg/kg	
十溴二苯醚	N.D.	5 mg/kg	

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检测结果

测试项目	结果	方法检出限	限值
邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)			
邻苯二甲酸二丁酯(DBP) CAS#:84-74-2	N.D.	50 mg/kg	1000 mg/kg
邻苯二甲酸丁基苄基酯(BBP) CAS#:85-68-7	N.D.	50 mg/kg	1000 mg/kg
邻苯二甲酸二(2-乙基)己酯(DEHP) CAS#:117-81-7	N.D.	50 mg/kg	1000 mg/kg
邻苯二甲酸二异丁酯(DIBP) CAS#:84-69-5	N.D.	50 mg/kg	1000 mg/kg
测试项目	结果	方法检出限	
铍(Be)	N.D.	10 mg/kg	
锑(Sb)	N.D.	10 mg/kg	
测试项目	结果	方法检出限	
六溴环十二烷(HBCDD)	N.D.	20 mg/kg	
测试项目	结果	方法检出限	
氟(F)	N.D.	1 µg/cm ²	
氯(Cl)	N.D.	1 µg/cm ²	
溴(Br)	N.D.	1 µg/cm ²	
碘(I)	N.D.	1 µg/cm ²	
测试项目	结果	方法检出限	
全氟辛烷磺酸(PFOS)	N.D.	0.5 µg/m ²	
测试项目	结果	方法检出限	
全氟辛酸(PFOA)	N.D.	0.5 µg/m ²	

样品/部位描述 金色镀层

备注: 对于检测铅, 镉, 汞, 铍, 锑之样品已消解完全。

-N.D. = 未检出 (小于方法检出限或定量限)

-mg/kg = ppm = 百万分之一

-1000 mg/kg = 0.1%

-LOQ = 定量限, 六价格的定量限为0.10 µg/cm²

-▼六价格浓度小于0.10 µg/cm², 样品未检出六价格

注释: 本报告中的数据结果供科研、教学、企业内部质量控制、企业产品研发等目的用。

“*”表示该方法不在CNAS 认可范围内。

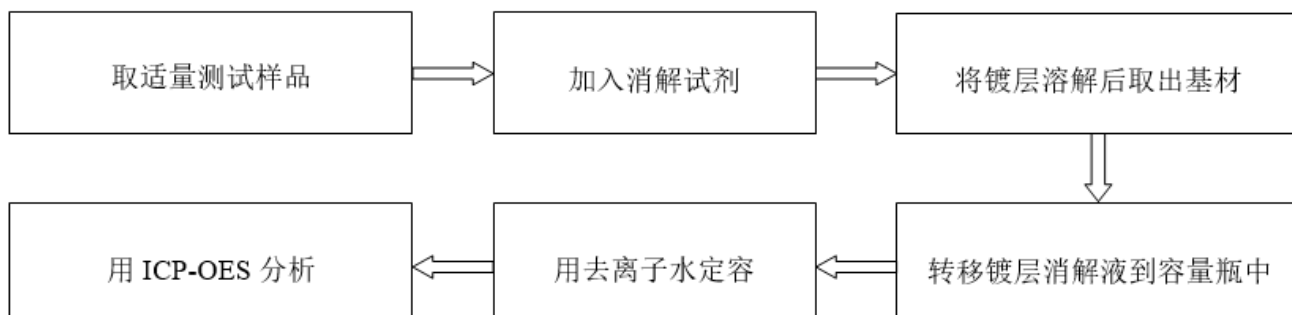
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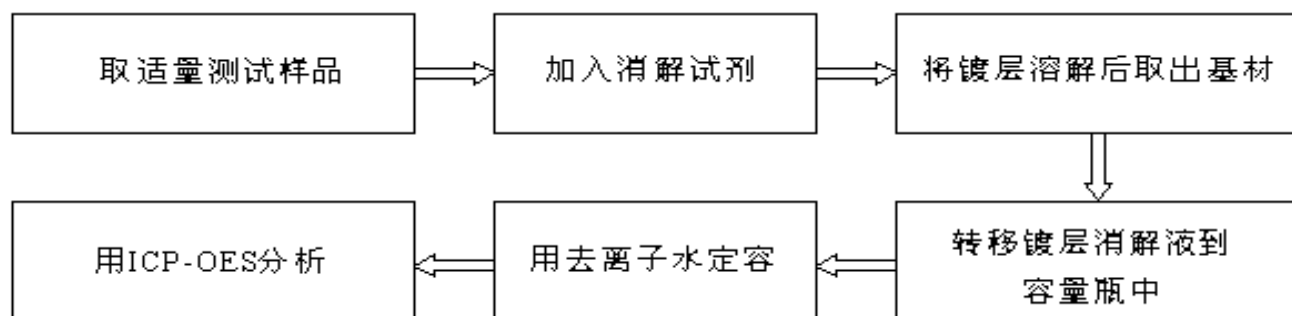
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检测流程

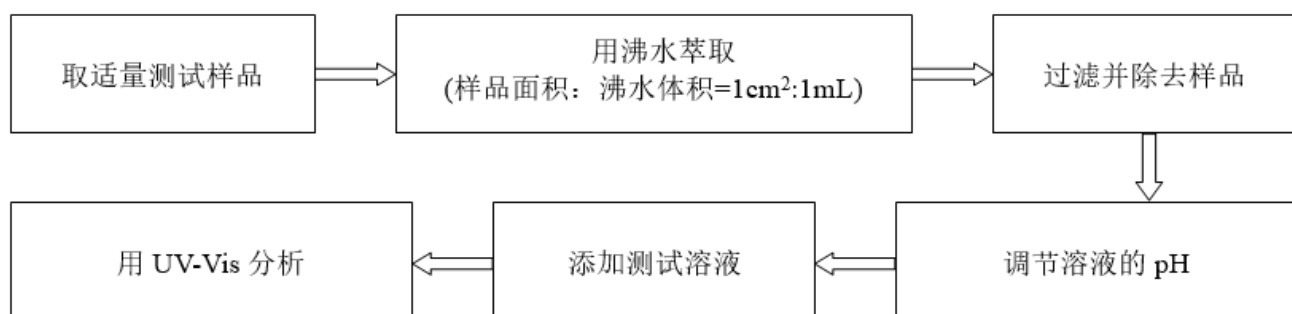
1. 铅(Pb), 镉(Cd)



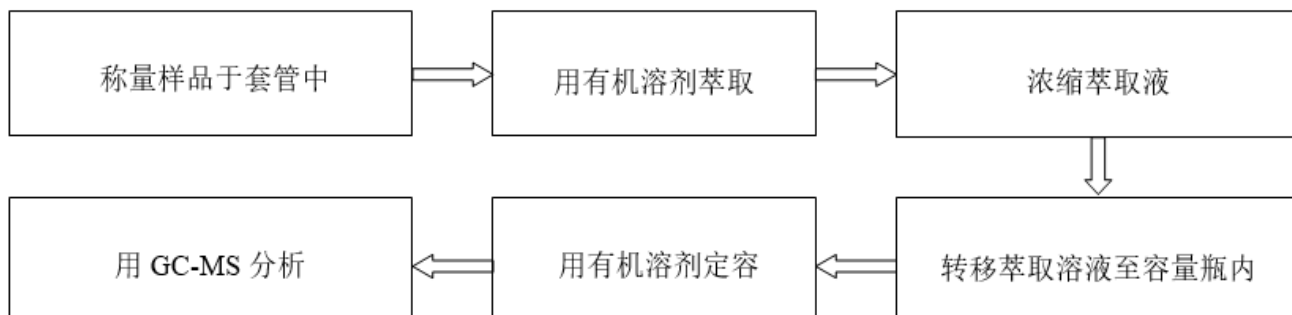
2. 汞(Hg)



3. 六价铬(Cr(VI))



4. 多溴联苯(PBBs), 多溴二苯醚(PBDEs)

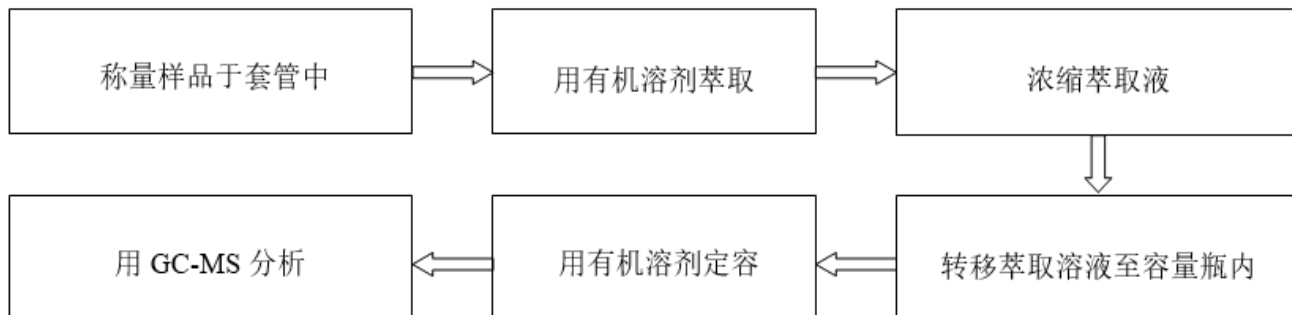


检测报告

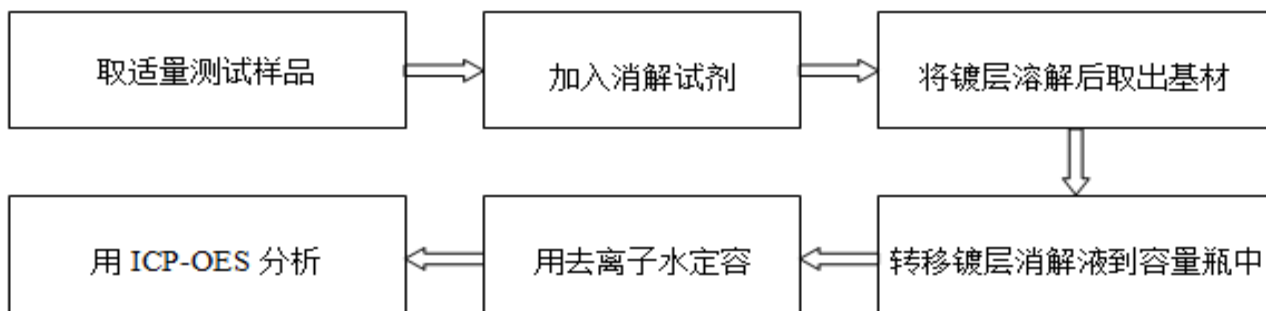
报告编号 A2220404860101001C

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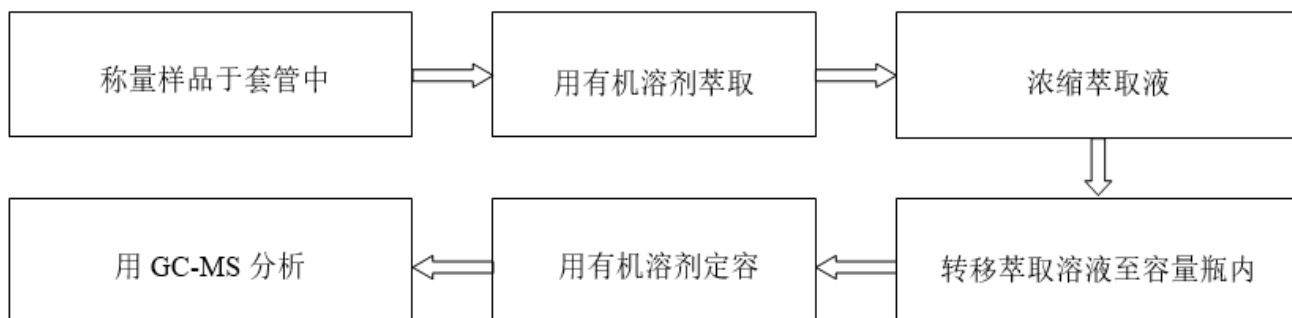
5. 邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)



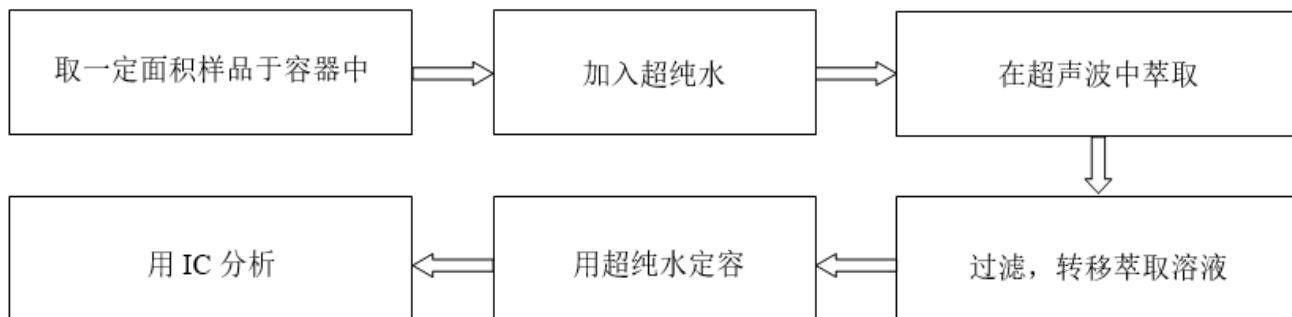
6. 铍(Be), 锑(Sb)



7. 六溴环十二烷(HBCDD)



8. 氟(F), 氯(Cl), 溴(Br), 碘(I)

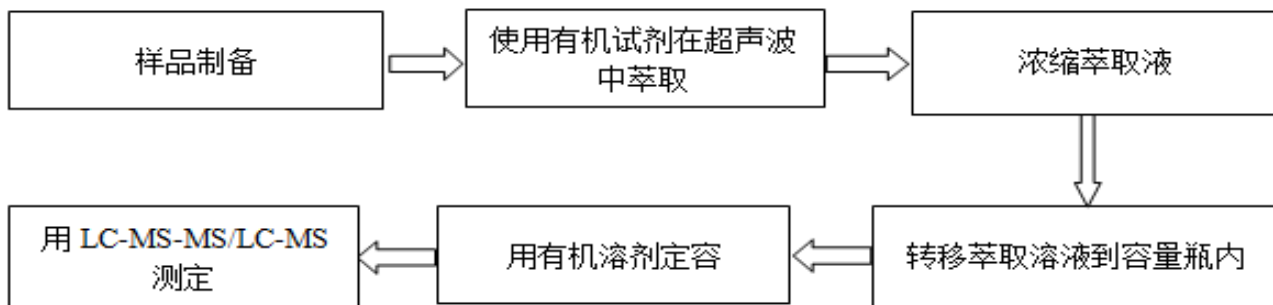


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9. 全氟辛烷磺酸(PFOS), 全氟辛酸(PFOA)



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样品图片



声明:

1. 检测报告无批准人签字、“专用章”及报告骑缝章无效;
2. 报告抬头公司名称及地址、样品及样品信息由申请者提供, 申请者应对其真实性负责, CTI未核实其真实性;
3. 本报告检测结果仅对受测样品负责;
4. 未经CTI书面同意, 不得部分复制本报告。

*** 报告结束 ***



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Report No. A2220207344101001E

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报告抬头公司名称 广东铭固化学科技有限公司
Company Name GUANGDONG MINGGU CHEMICAL TECHNOLOGY CO.,LTD.
shown on Report
地 址 中山市东升镇顺畅路25号二楼一楼
Address 1ST FLOOR, 2ND BUILDING, NO.25, SHUNCHANG ROAD, DONGSHENG TOWN, ZHONGSHAN CITY

以下测试之样品及样品信息由申请者提供并确认

The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant

样品名称 OSP抗氧化剂MK-5002
Sample Name OSP antioxidant MK-5002
样品接收日期 2022.05.26
Sample Received Date May 26, 2022
样品检测日期 2022.05.26-2022.05.30
Testing Period May 26, 2022 to May 30, 2022

检测要求 根据客户要求, 对所提交样品中的铅(Pb), 镉(Cd), 汞(Hg), 六价铬(Cr(VI)), 多溴联苯(PBBs), 多溴二苯醚(PBDEs), 邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)进行测试。

Test Requested As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs), Phthalates (DBP, BBP, DEHP, DIBP) in the submitted sample(s).

检测依据/检测结果 请参见下页。
Test Method/Test Result(s) Please refer to the following page(s).

主 检

张绍祥

审 核

方煜松

Tested by

Reviewed by

批准

郑晴涛

日 期

Approved by

Date

2022.05.30

郑晴涛

技术经理 Technical Manager

No. R262624073

检验检测有限公司

广东省深圳市宝安区新安街道兴东社区华测检测大楼

Centre Testing International Group Co., Ltd.

CTI Building, Xing Dong Community, Xin'an Sub-district, Bao'an District, Shenzhen City, Guangdong Province, P.R. China

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结论 Conclusion

测试样品 Tested Sample	依据标准/指令 According to standard/directive	结果 Result
提交样品 Submitted Sample	欧盟RoHS指令2011/65/EU及其修订指令(EU) 2015/863 RoHS Directive 2011/65/EU with amendment (EU) 2015/863	符合 PASS

符合表示检测结果满足欧盟RoHS指令2011/65/EU及其修订指令(EU) 2015/863要求的限值。
PASS means that the results shown on the report comply with the limits set by RoHS Directive 2011/65/EU with amendment (EU) 2015/863.

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检测依据 Test Method

测试项目 Test Item(s)	测试方法 Test Method	测试仪器 Measured Equipment(s)
铅 Lead (Pb)	IEC 62321-5:2013	ICP-OES
镉 Cadmium (Cd)	IEC 62321-5:2013	ICP-OES
汞 Mercury (Hg)	IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES
六价铬 Hexavalent Chromium (Cr(VI))	IEC 62321-7-2:2017和/或IEC 62321-5:2013测试总铬含量 IEC 62321-7-2:2017 and/or determination of Total Chromium by IEC 62321-5:2013	UV-Vis/ICP-OES
多溴联苯 Polybrominated Biphenyls (PBBs)	IEC 62321-6:2015	GC-MS
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS
邻苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS

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检测结果 Test Result(s)

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL	限值 Limit
铅 Lead (Pb)	N.D.	2 mg/kg	1000 mg/kg
镉 Cadmium (Cd)	N.D.	2 mg/kg	100 mg/kg
汞 Mercury (Hg)	N.D.	2 mg/kg	1000 mg/kg
六价铬 Hexavalent Chromium (Cr(VI))	N.D.	8 mg/kg	1000 mg/kg

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL	限值 Limit
多溴联苯 Polybrominated Biphenyls (PBBs)			
一溴联苯 Monobromobiphenyl	N.D.	5 mg/kg	1000 mg/kg
二溴联苯 Dibromobiphenyl	N.D.	5 mg/kg	
三溴联苯 Tribromobiphenyl	N.D.	5 mg/kg	
四溴联苯 Tetrabromobiphenyl	N.D.	5 mg/kg	
五溴联苯 Pentabromobiphenyl	N.D.	5 mg/kg	
六溴联苯 Hexabromobiphenyl	N.D.	5 mg/kg	
七溴联苯 Heptabromobiphenyl	N.D.	5 mg/kg	
八溴联苯 Octabromobiphenyl	N.D.	5 mg/kg	
九溴联苯 Nonabromobiphenyl	N.D.	5 mg/kg	
十溴联苯 Decabromobiphenyl	N.D.	5 mg/kg	

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL	限值 Limit
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)			
一溴二苯醚 Monobromodiphenyl ether	N.D.	5 mg/kg	1000 mg/kg
二溴二苯醚 Dibromodiphenyl ether	N.D.	5 mg/kg	
三溴二苯醚 Tribromodiphenyl ether	N.D.	5 mg/kg	
四溴二苯醚 Tetrabromodiphenyl ether	N.D.	5 mg/kg	
五溴二苯醚 Pentabromodiphenyl ether	N.D.	5 mg/kg	
六溴二苯醚 Hexabromodiphenyl ether	N.D.	5 mg/kg	
七溴二苯醚 Heptabromodiphenyl ether	N.D.	5 mg/kg	
八溴二苯醚 Octabromodiphenyl ether	N.D.	5 mg/kg	
九溴二苯醚 Nonabromodiphenyl ether	N.D.	5 mg/kg	
十溴二苯醚 Decabromodiphenyl ether	N.D.	5 mg/kg	

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检测结果 Test Result(s)

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL	限值 Limit
邻苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)			
邻苯二甲酸二丁酯 Dibutyl phthalate (DBP) CAS#:84-74-2	N.D.	50 mg/kg	1000 mg/kg
邻苯二甲酸丁基苄基酯 Butyl benzyl phthalate (BBP) CAS#:85-68-7	N.D.	50 mg/kg	1000 mg/kg
邻苯二甲酸二(2-乙基)己酯 Di-(2-ethylhexyl) phthalate (DEHP) CAS#:117-81-7	N.D.	50 mg/kg	1000 mg/kg
邻苯二甲酸二异丁酯 Diisobutyl phthalate (DIBP) CAS#:84-69-5	N.D.	50 mg/kg	1000 mg/kg

样品/部位描述 蓝色液体
Sample/Part Description Blue liquid

备注: 对于检测铅, 镉, 汞之样品已消解完全。

- N.D. = 未检出 (小于方法检出限)
- mg/kg = ppm = 百万分之一
- 1000 mg/kg = 0.1%

Remark: **The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.**

- MDL = Method Detection Limit
- N.D. = Not Detected (<MDL)
- mg/kg = ppm = parts per million
- 1000 mg/kg = 0.1%

CTI 华测检测

检测报告 Test Report

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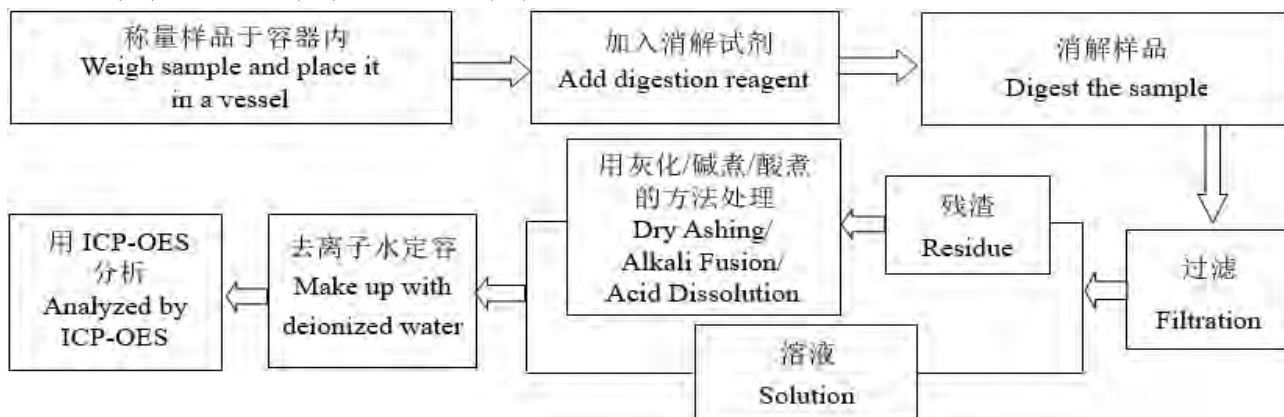
Report No. A2220207344101001E

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检测流程 Test Process

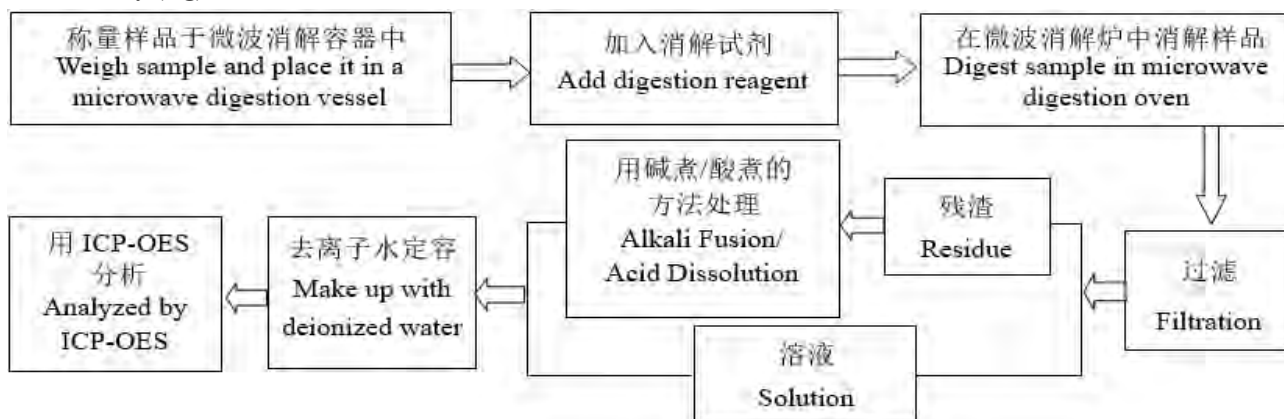
1. 铅(Pb), 镉(Cd), 铬(Cr)

Lead (Pb), Cadmium (Cd), Chromium (Cr)



2. 汞(Hg)

Mercury (Hg)



3. 六价铬(Cr(VI))

Hexavalent Chromium (Cr(VI))



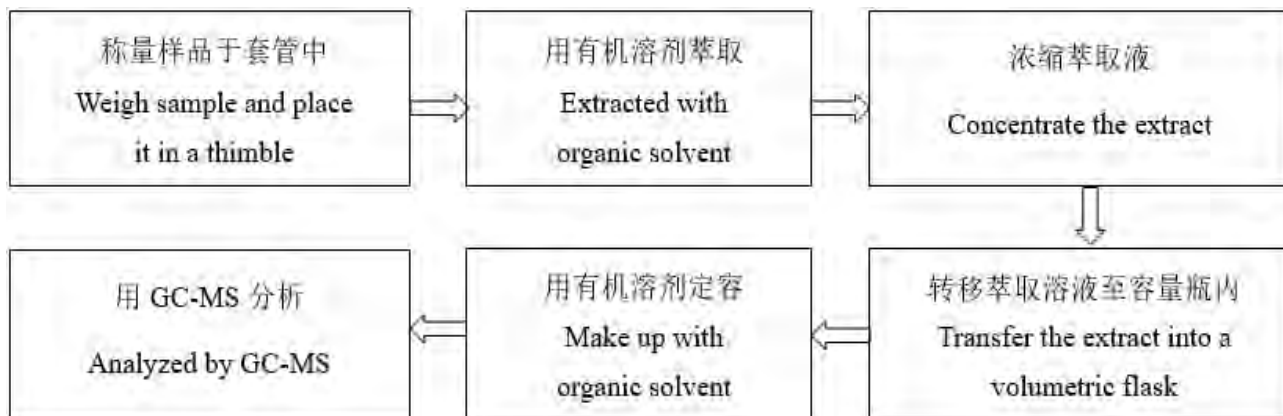
检测报告 Test Report

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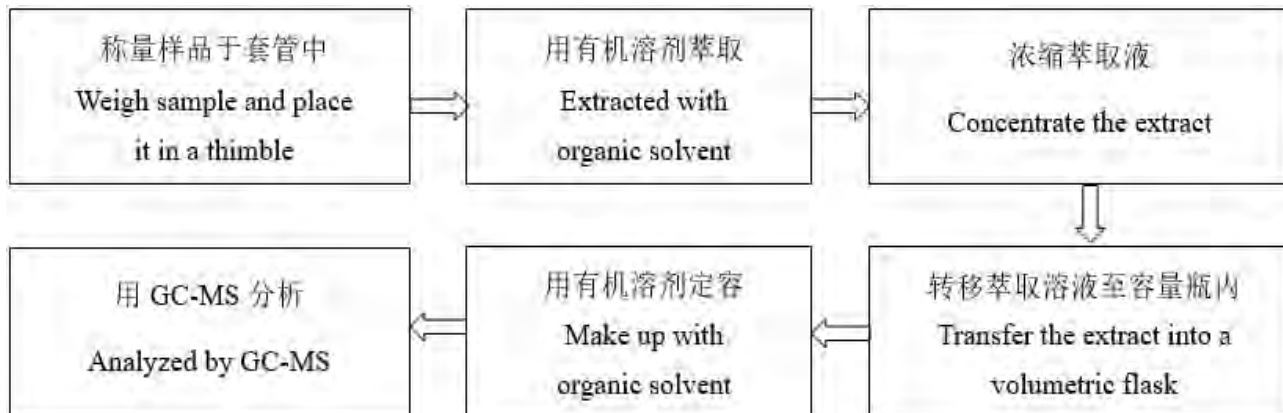
4. 多溴联苯 (PBBs), 多溴二苯醚 (PBDEs)

Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)



5. 邻苯二甲酸酯 (DBP, BBP, DEHP, DIBP)

Phthalates (DBP, BBP, DEHP, DIBP)



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样品图片 Photo(s) of the sample(s)



声明Statement:

1. 检测报告无批准人签字、“专用章”及报告骑缝章无效;
This report is considered invalid without approved signature, special seal and the seal on the perforation;
2. 报告抬头公司名称及地址、样品及样品信息由申请者提供, 申请者应对其真实性负责, CTI未核实其真实性;
The Company Name shown on Report and Address, the sample(s) and sample information was/were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified;
3. 本报告检测结果仅对受测样品负责;
The result(s) shown in this report refer(s) only to the sample(s) tested;
4. 未经CTI书面同意, 不得部分复制本报告;
Without written approval of CTI, this report can't be reproduced except in full;
5. 如检测报告中的英文内容与中文内容有差异, 以中文为准。
In case of any discrepancy between the English version and Chinese version of the testing reports (if generated), the Chinese version shall prevail.

报告结束

*** End of report ***

检测报告

编号: CANEC2203842102

日期: 2022年03月16日 第1页,共7页

客户名称: 肇庆粤阳电子科技有限公司/中山市粤阳电子有限公司/深圳金粤阳科技有限公司
客户地址: 肇庆市蚬岗镇蚬岗工业园
中山市火炬开发区岐关东路48号一楼A区车间103
深圳市宝安区新安街道留仙二路中粮商务公园3栋609

样品名称: 液态感光阻焊油墨
型号: YSR-900 BK02
客户参考信息: YSR-900 BK, BK01, BKHF01, BK02(plug hole), BKHF02, BK03, BKHF03H, BK04, BK05, BKHF06, BKHF07, MBK, MBK01, MBK02, MBK03, MBK04, MBK05, MBK06, MBK07, MBK08, MBKHF01, MBKHF02, MBKHF03, MBKHF04, MBKHF05, MBKHF06, MBKHF07, MBKHF08, MBKHF09, MBKHF10, MBKHF11, MBKHF12, MBKHF13, MBKHF14, MBKHF15.

以上样品及信息由客户提供。

SGS工作编号: CP22-011268 - GZ
样品接收日期: 2022年03月11日
检测周期: 2022年03月11日 - 2022年03月16日
检测要求: 根据客户要求检测
检测方法: 请参见下一页
检测结果: 请参见下一页
结论: 基于所送样品进行的检测, 镉、铅、汞、六价铬、多溴联苯(PBBs)、多溴二苯醚(PBDEs)、邻苯二甲酸酯(如邻苯二甲酸二丁酯(DBP)、邻苯二甲酸丁酯(BBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)和邻苯二甲酸二异丁酯(DIBP))的检测结果显示符合欧盟RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863的限值要求。

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授权签名

陈江梨

Allie Chen陈江梨
批准签署人



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t (86-20) 82155555 www.sgs.com.cn
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检测报告

编号: CANEC2203842102

日期: 2022年03月16日 第2页,共7页

检测结果:

检测样品描述:

样品编号	SGS样品ID	描述
SN1	CAN22-038421.001	黑色物料

备注:

- (1) 1 mg/kg = 1 ppm = 0.0001%
- (2) MDL = 方法检测限
- (3) ND = 未检出 (< MDL)
- (4) "-" = 未规定

RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863

检测方法: 参考IEC 62321-4:2013+A1:2017, IEC 62321-5:2013, IEC 62321-7-2:2017, IEC 62321-6:2015 和 IEC 62321-8:2017, 采用 ICP-OES, UV-Vis 和 GC-MS 进行分析.

检测项目	限值	单位	MDL	001
镉 (Cd)	100	mg/kg	2	ND
铅 (Pb)	1,000	mg/kg	2	ND
汞 (Hg)	1,000	mg/kg	2	ND
六价铬(Cr(VI))	1,000	mg/kg	8	ND
多溴联苯之和(PBBs)	1,000	mg/kg	-	ND
一溴联苯	-	mg/kg	5	ND
二溴联苯	-	mg/kg	5	ND
三溴联苯	-	mg/kg	5	ND
四溴联苯	-	mg/kg	5	ND
五溴联苯	-	mg/kg	5	ND
六溴联苯	-	mg/kg	5	ND
七溴联苯	-	mg/kg	5	ND
八溴联苯	-	mg/kg	5	ND
九溴联苯	-	mg/kg	5	ND
十溴联苯	-	mg/kg	5	ND
多溴二苯醚之和(PBDEs)	1,000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND
二溴二苯醚	-	mg/kg	5	ND
三溴二苯醚	-	mg/kg	5	ND
四溴二苯醚	-	mg/kg	5	ND
五溴二苯醚	-	mg/kg	5	ND



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检测报告

编号: CANEC2203842102

日期: 2022年03月16日 第3页,共7页

检测项目	限值	单位	MDL	001
六溴二苯醚	-	mg/kg	5	ND
七溴二苯醚	-	mg/kg	5	ND
八溴二苯醚	-	mg/kg	5	ND
九溴二苯醚	-	mg/kg	5	ND
十溴二苯醚	-	mg/kg	5	ND
邻苯二甲酸二丁酯 (DBP)	1,000	mg/kg	50	ND
邻苯二甲酸丁苄酯(BBP)	1,000	mg/kg	50	ND
邻苯二甲酸二(2-乙基己基)酯(DEHP)	1,000	mg/kg	50	ND
邻苯二甲酸二异丁酯(DIBP)	1,000	mg/kg	50	ND

备注:

(1)最大允许极限值引用自RoHS指令(EU) 2015/863。

(2) IEC 62321 系列等同于 EN 62321 系列

https://www.cenelec.eu/dyn/www/?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25

(3) 2021年7月22号开始, DEHP, BBP, DBP 和 DIBP的限制适用于医疗器械, 包括体外医疗器械, 监控仪表, 包括工业监测和控制仪器。

卤素

检测方法: 参考EN 14582:2016, 用 IC分析。

检测项目	单位	MDL	001
氟 (F)	mg/kg	50	166
氯 (Cl)	mg/kg	50	344
溴 (Br)	mg/kg	50	ND
碘 (I)	mg/kg	50	ND

除非另有说明, 此报告结果仅对检测的样品负责。本报告未经本公司书面许可, 不可部分复制。检测报告仅用于客户科研、教学、内部质量控制、产品研发等目的, 仅供内部参考。



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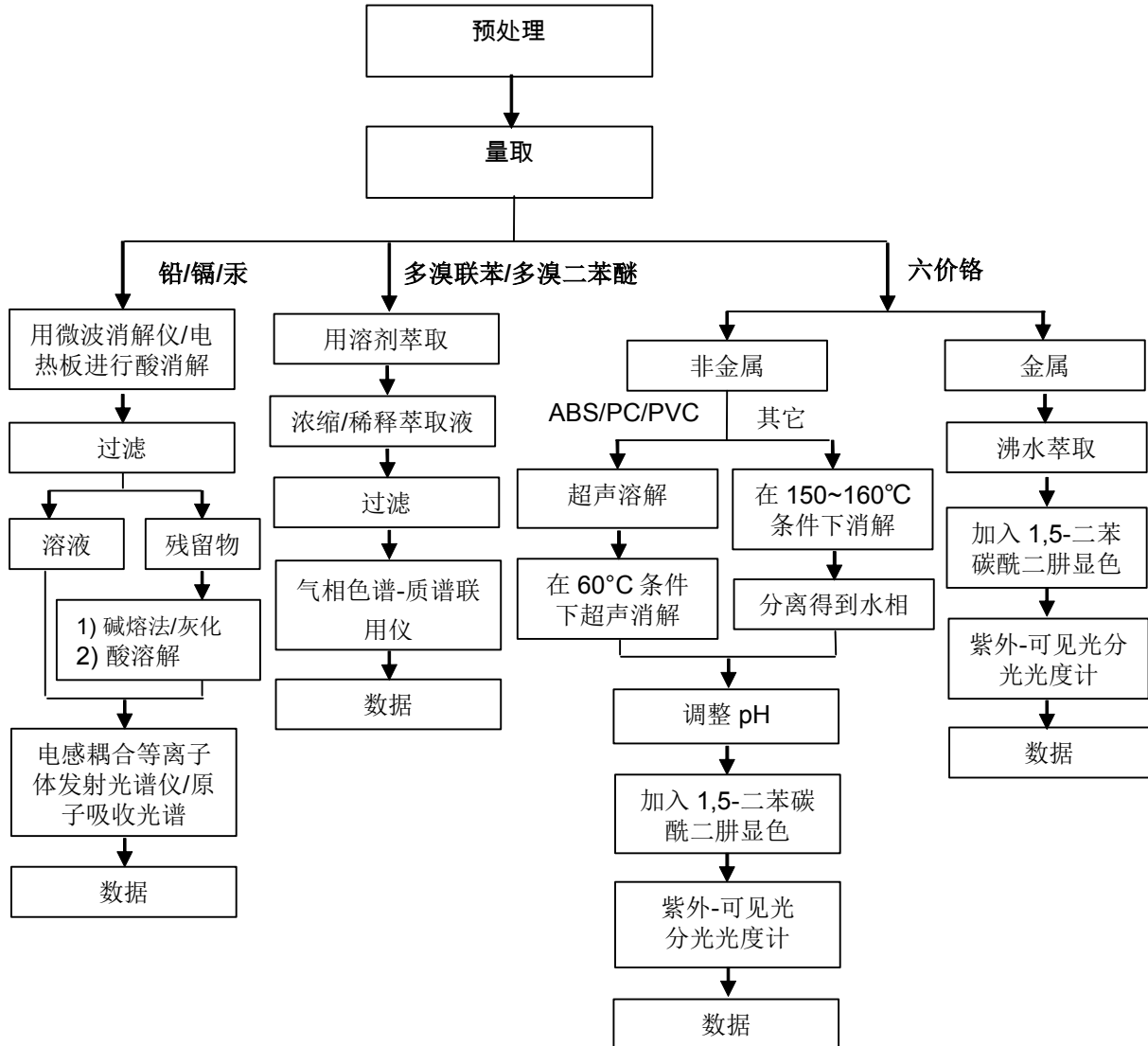
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t (86-20) 82155555 sgs.china@sgs.com

附件

Pb/Cd/Hg/Cr⁶⁺/PBBs/PBDEs 检测流程图

1) 样品按照下述流程被完全消解（六价铬和多溴联苯/多溴二苯醚检测除外）。



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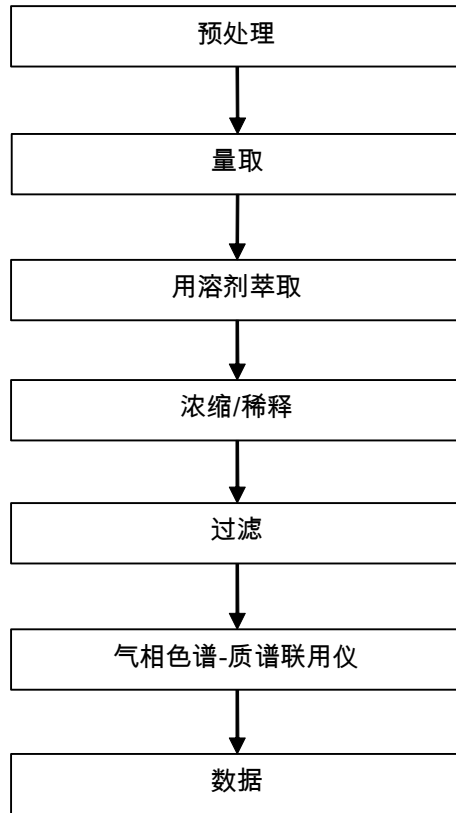
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Guangzhou Branch / 广州分公司 化学实验室

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附件

Phthalates 检测流程图

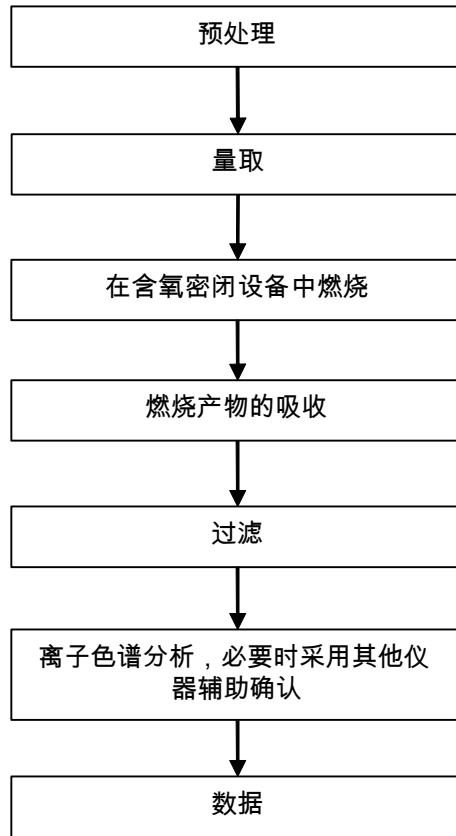


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附件

Halogen 检测流程图



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检测报告

编号: CANEC2203842102

日期: 2022年03月16日 第7页,共7页

样品照片:



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*** 报告完 ***



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测试报告

No. SHAEC2125787202

日期: 2021年12月02日 第1页,共17页

上海国纪电子材料有限公司
上海市松江区工业园区宝胜路33号

以下测试之样品是由申请者所提供及确认: FR-4.0环氧玻纤板

SGS工作编号: SP21-036657 - SH
样品接收日期: 2021年11月25日
测试周期: 2021年11月25日 - 2021年12月02日
测试要求: 根据客户要求测试
测试方法: 请参见下一页
测试结果: 请参见下一页

结论: 基于所送样品进行的测试, 镉、铅、汞、六价铬、多溴联苯(PBBs)、多溴二苯醚(PBDEs)、邻苯二甲酸酯(如邻苯二甲酸二丁酯(DBP)、邻苯二甲酸丁苯酯(BBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)和邻苯二甲酸二异丁酯(DIBP))的测试结果符合欧盟RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863的限值要求。

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测试结果:

测试样品描述:

样品编号	SGS样品ID	描述
SN1	SHA21-257872.001	铜色/棕色固体板

备注:

- (1) 1 mg/kg = 0.0001%
- (2) MDL = 方法检测限
- (3) ND = 未检出 (< MDL)
- (4) "-" = 未规定

RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863

测试方法: 参考IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013, IEC 62321-7-2:2017, IEC 62321-6:2015和IEC 62321-8:2017, 采用ICP-OES, UV-Vis和GC-MS进行分析。

测试项目	限值	单位	MDL	001
镉(Cd)	100	mg/kg	2	ND
铅(Pb)	1000	mg/kg	2	8
汞(Hg)	1000	mg/kg	2	ND
六价铬 (Cr(VI))	1000	mg/kg	8	ND
多溴联苯之和(PBBs)	1000	mg/kg	-	ND
一溴联苯	-	mg/kg	5	ND
二溴联苯	-	mg/kg	5	ND
三溴联苯	-	mg/kg	5	ND
四溴联苯	-	mg/kg	5	ND
五溴联苯	-	mg/kg	5	ND
六溴联苯	-	mg/kg	5	ND
七溴联苯	-	mg/kg	5	ND
八溴联苯	-	mg/kg	5	ND
九溴联苯	-	mg/kg	5	ND
十溴联苯	-	mg/kg	5	ND
多溴二苯醚之和(PBDEs)	1000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND
二溴二苯醚	-	mg/kg	5	ND
三溴二苯醚	-	mg/kg	5	ND
四溴二苯醚	-	mg/kg	5	ND



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测试报告

No. SHAEC2125787202

日期: 2021年12月02日 第3页,共17页

测试项目	限值	单位	MDL	001
五溴二苯醚	-	mg/kg	5	ND
六溴二苯醚	-	mg/kg	5	ND
七溴二苯醚	-	mg/kg	5	ND
八溴二苯醚	-	mg/kg	5	ND
九溴二苯醚	-	mg/kg	5	ND
十溴二苯醚	-	mg/kg	5	ND
邻苯二甲酸二丁酯 (DBP)	1000	mg/kg	50	ND
邻苯二甲酸丁苄酯(BBP)	1000	mg/kg	50	ND
邻苯二甲酸二(2-乙基己基)酯(DEHP)	1000	mg/kg	50	ND
邻苯二甲酸二异丁酯(DIBP)	1000	mg/kg	50	ND

备注:

(1) 最大允许极限值引用自RoHS指令(EU) 2015/863。

IEC 62321系列等同于 EN 62321系列

https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25

(2) 2021年7月22号开始, DEHP, BBP, DBP 和 DIBP的限制适用于医疗器械, 包括体外医疗器械, 监控仪表, 包括工业监测和控制仪器。

硫(S)

测试方法: 参照EN 14582:2016. 用IC方法检测.

测试项目	单位	MDL	001
硫 (S)	mg/kg	50	ND

元素

测试方法: 参照US EPA 方法3052:1996测定, 采用ICP-OES进行分析.

测试项目	单位	MDL	001
磷(P)	mg/kg	20	139



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石棉

测试方法: 参照NIOSH 9002:1994, 用偏光显微镜定性测定石棉.

测试项目	CAS NO.	单位	MDL	001
阳起石	77536-66-4	%	0.1	阴性
铁石棉	12172-73-5	%	0.1	阴性
直闪石	77536-67-5	%	0.1	阴性
温石棉	12001-29-5 132207-32-0	%	0.1	阴性
青石棉	12001-28-4	%	0.1	阴性
透闪石	77536-68-6	%	0.1	阴性

备注:

(1) 阴性=未检出石棉, 阳性=检出石棉

六溴环十二烷(HBCDD)

测试方法: 参考IEC 62321:2008, 采用GC-MS分析六溴环十二烷含量.

测试项目	单位	MDL	001
六溴环十二烷(HBCDD)	mg/kg	10	ND

全氟辛烷磺酸及其衍生物(PFOS)和全氟辛酸(PFOA)及其盐

测试方法: 参考 CEN/TS 15968: 2010方法, 采用HPLC-MS进行分析.

测试项目	CAS NO.	单位	MDL	001
全氟辛烷磺酸 (PFOS) 及衍生物	-	mg/kg	-	ND
全氟辛烷磺酸 (PFOS) ^	1763-23-1	mg/kg	10	ND
N-乙基全氟辛烷磺酰胺 (EtFOSA)	4151-50-2	mg/kg	10	ND
N-甲基全氟辛烷磺酰胺 (MeFOSA)	31506-32-8	mg/kg	10	ND
2-(N-乙基全氟辛基磺酰胺)乙醇 (EtFOSE)	1691-99-2	mg/kg	10	ND



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测试报告

No. SHAEC2125787202

日期: 2021年12月02日

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测试项目	CAS NO.	单位	MDL	001
2-(N-甲基全氟辛基磺酰胺)乙醇 (MeFOSE)	24448-09-7	mg/kg	10	ND
全氟辛基磺酰胺 (PFOSA)	754-91-6	mg/kg	10	ND
全氟辛酸 (PFOA) 及其盐+	-	mg/kg	10	ND

备注:

- (1) ^ 全氟辛烷磺酸 (PFOS) 包含 PFOS-K (CAS No.: 2795-39-3), PFOS-Li (CAS No.: 29457-72-5), PFOS-NH4 (CAS No.: 29081-56-9), PFOS-NH(OH)2 (CAS No.: 70225-14-8), PFOS-N(C2H5)4 (CAS No.: 56773-42-3), PFOS-DDA (CAS No.: 251099-16-8) 和 POSF (CAS No.: 307-35-7)
- (2) PFOA 及其盐+是指其酸/盐, 包括全氟辛酸(CAS No.: 335-67-1), 全氟辛酸钠 (CAS No.: 335-95-5), 全氟辛酸钾 (CAS No.: 2395-00-8), 全氟辛酸银 (CAS No.: 335-93-3), 全氟辛酰氟 (CAS No.: 335-66-0) 和 全氟辛酸铵 (CAS No.: 3825-26-1)。

多环芳香烃(PAHs)

测试方法: 参考AfPS GS 2019:01 PAK 方法测试, 采用 GC-MS 进行分析。

测试项目	单位	MDL	001
苯并(a)芘 (BaP)	mg/kg	0.1	ND
苯并(e)芘 (BeP)	mg/kg	0.1	ND
苯并(a)蒽 (BaA)	mg/kg	0.1	ND
苯并(b)荧蒽 (BbF)	mg/kg	0.1	ND
苯并(j)荧蒽 (BjF)	mg/kg	0.1	ND
苯并(k)荧蒽 (BkF)	mg/kg	0.1	ND
蒽 (CHR)	mg/kg	0.1	ND
二苯并(a,h)蒽(DBA)	mg/kg	0.1	ND
苯并(g,h,i)芘(二萘嵌苯) (BPE)	mg/kg	0.1	ND
茚并(1,2,3-c,d)芘 (IPY)	mg/kg	0.1	ND
菲 (PHE)	mg/kg	0.1	ND
芘 (PYR)	mg/kg	0.1	ND
蒽 (ANT)	mg/kg	0.1	ND
荧蒽 (FLT)	mg/kg	0.1	ND
4项多环芳香烃总和[菲 (PHE), 芘 (PYR), 蒽 (ANT), 荧蒽 (FLT)]	mg/kg	-	ND
萘 (NAP)	mg/kg	0.1	ND
15项多环芳香烃总和	mg/kg	-	ND



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AfPS (德国产品安全委员会): 多环芳香烃的要求

参数 单位: mg/kg	1类	2类		3类	
	设计意图为放入口中的材料, 或与皮肤长期接触 (超过 30 秒) 的材料用于 -2009/48/EC 定义的玩具, 或 -供3岁以下儿童 ^{a,b} 使用。	不属于第 1 类, 设计意图或可预见 ^d 与皮肤长期接触 (超过 30 秒) 或短期重复接触 ^c 的材料		不属于第 1 和 2 类, 设计意图或可预见与皮肤短期接触 (不超过 30 秒) 材料	
		a 供儿童使用的产品	b 其他产品	a 供儿童使用的产品	b 其他产品
苯并(a)芘 (BaP)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(e)芘 (BeP)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(a)蒽 (BaA)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(b)荧蒽 (BbF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(i)荧蒽 (BjF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(k)荧蒽 (BkF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
蒽 (CHR) ,mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
二苯并(a,h)蒽 (DBA)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(g,h,i)花(二萘嵌苯) (BPE)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
茚苯(1,2,3-c,d)芘 (IPY)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
菲 (PHE), 芘 (PYR), 蒽 (ANT), 荧蒽 (FLT)	< 1 (总和)	< 5 (总和)	< 10 (总和)	< 20 (总和)	< 50 (总和)
萘 (NAP)	< 1	< 2		< 10	
15 PAH之和	< 1	< 5	< 10	< 20	< 50

注释:

- ^a 儿童是指法定年龄未满 14 周岁的人。
- ^b 供儿童使用包括儿童的主动接触或被动接触。
- ^c “短期重复接触”的定义摘自 REACH 附录 XVII 第 50 条修正案 ((EC) No. 1272/2013)。
- ^d 根据德国产品安全法 (ProdSG) (第一章第 2 条第 28 款) 的定义, “可预见的使用”是指将产品投放市场的人无意但可以合理预见的方式使用产品。

备注:

德国产品安全委员会 (AfPS) 于 2020 年 4 月 10 日发布了关于多环芳香烃 (PAHs) 的新文件 (AfPS GS 2019:01 PAK), 该文件将于 2020 年 7 月 1 日起用于 GS-MARK 认证。

邻苯二甲酸盐(或酯)

测试方法: 参照 EN 14372: 2004 的方法测定, 采用 GC-MS 进行分析.

测试项目	CAS NO.	单位	MDL	001
邻苯二甲酸二丁酯(DBP)	84-74-2	%	0.003	ND
邻苯二甲酸丁苄酯 (BBP)	85-68-7	%	0.003	ND
邻苯二甲酸二(2-乙基己基)酯 (DEHP)	117-81-7	%	0.003	ND
邻苯二甲酸二异壬酯 (DINP)	28553-12-0/ 68515-48-0	%	0.01	ND
邻苯二甲酸二正辛酯 (DNOP)	117-84-0	%	0.003	ND
邻苯二甲酸二异癸酯 (DIDP)	26761-40-0 /68515-49-1	%	0.01	ND
邻苯二甲酸二正己酯(DnHP)	84-75-3	%	0.003	ND



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测试报告

No. SHAEC2125787202

日期: 2021年12月02日 第7页,共17页

测试项目	CAS NO.	单位	MDL	001
邻苯二甲酸二异丁酯(DIBP)	84-69-5	%	0.003	ND

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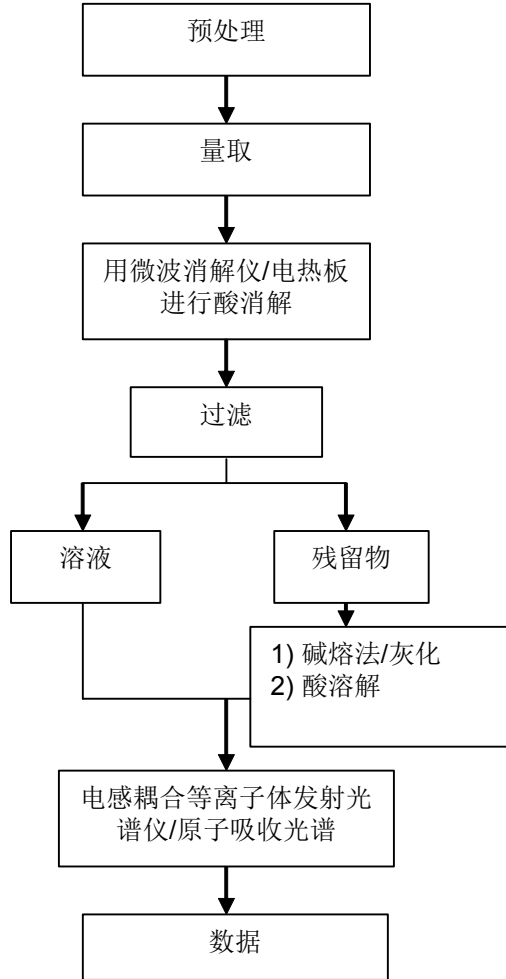


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元素(IEC62321) 测试流程图

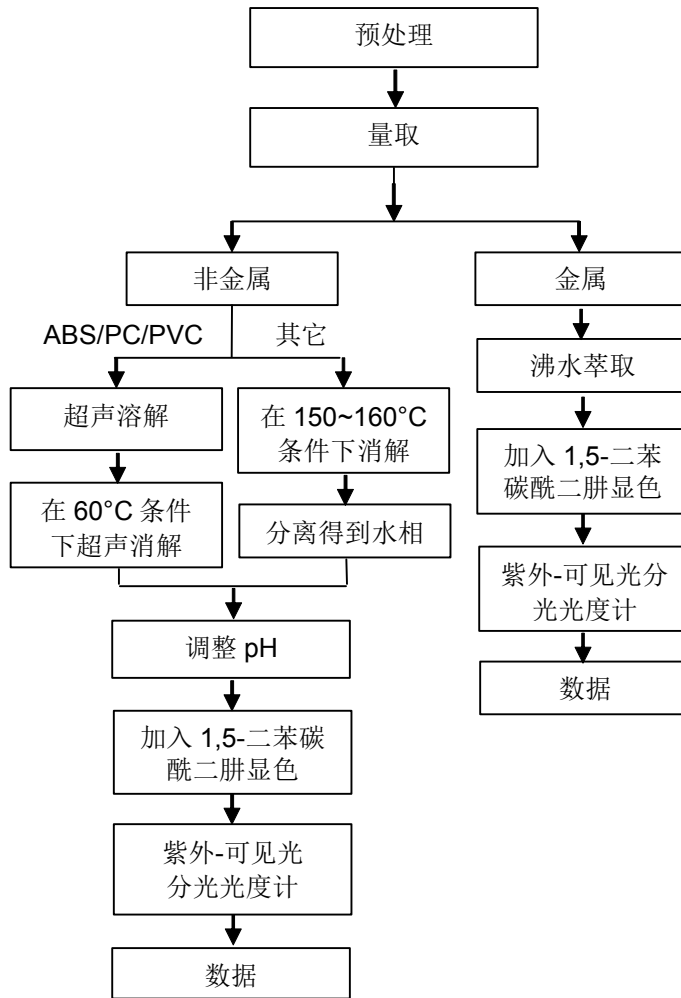
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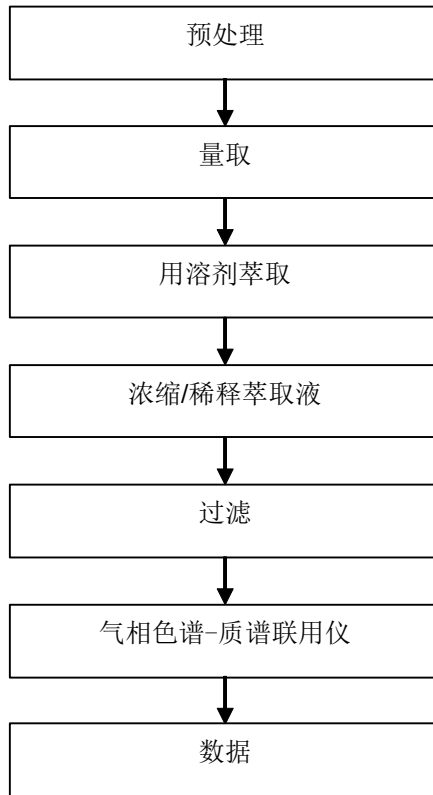
六价铬测试流程图



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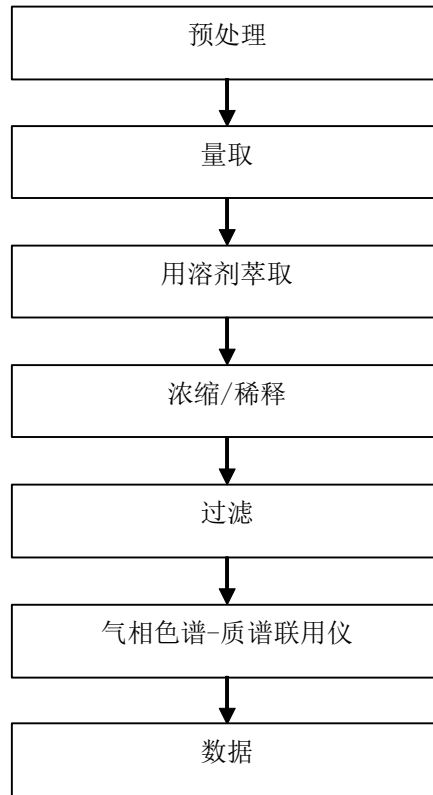
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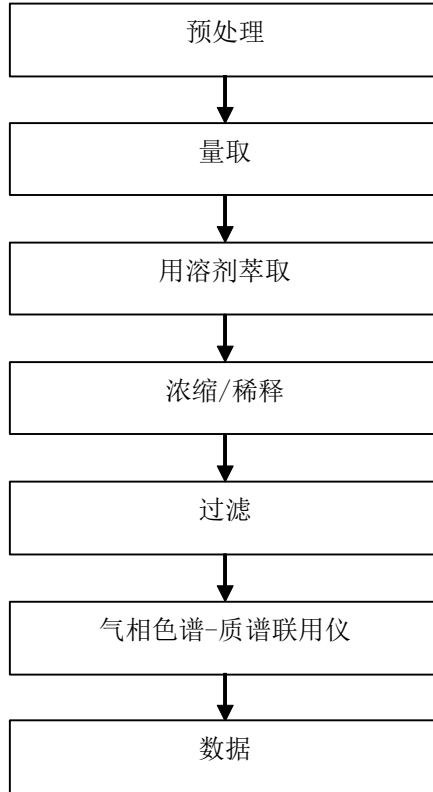
Phthalates 测试流程图



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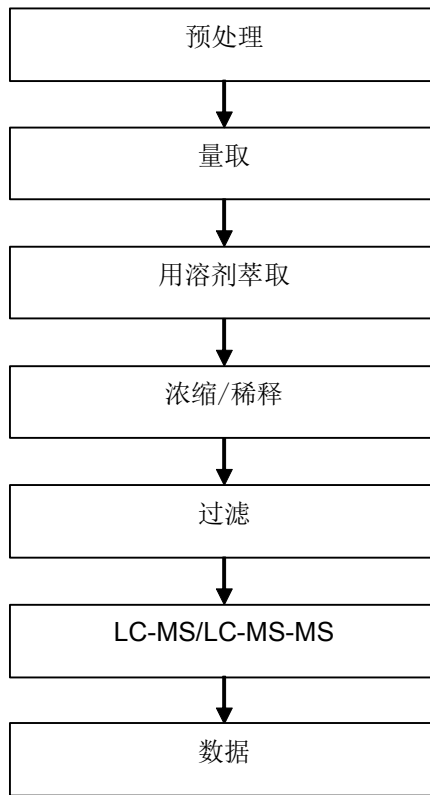
HBCDD 测试流程图



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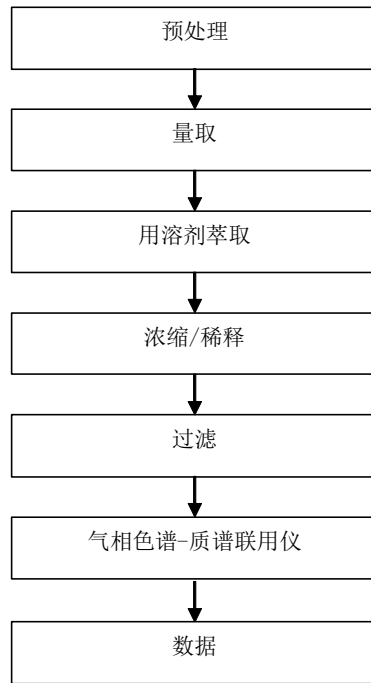
PFASs/ PFOS/PFOA 测试流程图



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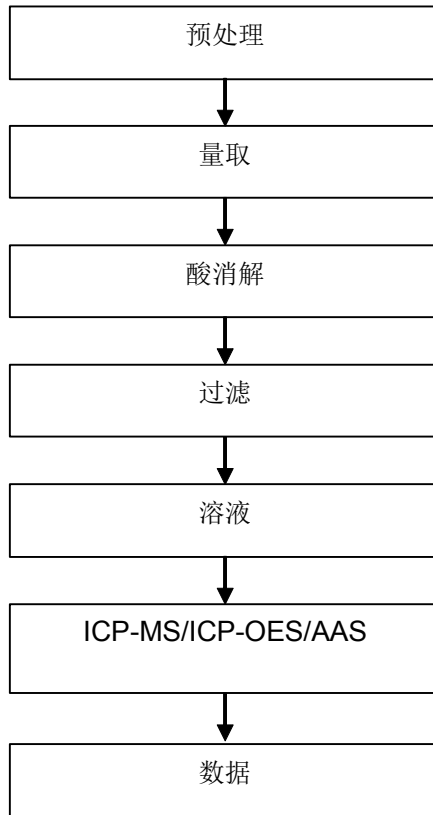
PAHs 测试流程图



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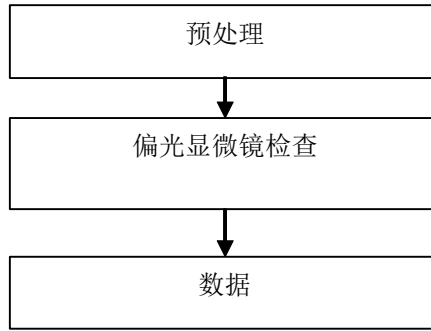
元素测试流程图



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Asbestos 测试流程图



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*** 报告完 ***



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检测报告 Test Report

报告编号 A2220186128101ER1
Report No. A2220186128101ER1

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Page 1 of 10

报告抬头公司名称 无锡市明星精密线材有限公司
Company Name WUXI CITY MINGXING PRECISION CO.,LTD
shown on Report
地 址 江苏省无锡市鹅湖镇甘露甘厚路工业集中区
Address GANHOU ROAD, INDUSTRIAL FOCUS AREAS, GANLU E'HU TOWN, WUXI CITY, JIANGSU PROVINCE

以下测试之样品及样品信息由申请者提供并确认

The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant

样品名称 镀锡铜线
Sample Name TINNDE COPPER WIRE
样品接收日期 2022.05.13
Sample Received Date May 13, 2022
样品检测日期 2022.05.13-2022.05.17
Testing Period May 13, 2022 to May 17, 2022

检测要求 根据客户要求, 对所提交样品中的铅(Pb), 镉(Cd), 汞(Hg), 六价铬(Cr(VI)), 多溴联苯(PBBs), 多溴二苯醚(PBDEs), 邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)进行测试。

Test Requested As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs), Phthalates (DBP, BBP, DEHP, DIBP) in the submitted sample(s).

检测依据/检测结果 请参见下页。

Test Method/Test Result(s) Please refer to the following page(s).

主 检
Tested by 廖红月

审 核
Reviewed by 方理松

批 准
Approved by 刘琳慧

日 期
Date 2022.05.17

刘琳慧
授权签字人 Lab Authorized Signatory

No. R530011260

华测检测集团股份有限公司
Inspection & Testing Services
Centre Testing International Group Co.,Ltd.

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CTI Building, Xing Dong Community, Xin'an Sub-district, Bao'an District, Shenzhen City, Guangdong Province, P.R. China

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Test Report

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检测依据 Test Method

测试项目 Tested Item(s)	测试方法 Test Method	测试仪器 Measured Equipment(s)
铅 Lead (Pb)	IEC 62321-5:2013	ICP-OES
镉 Cadmium (Cd)	IEC 62321-5:2013	ICP-OES
	参考 IEC 62321-5:2013 Refer to IEC 62321-5:2013	
汞 Mercury (Hg)	IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES
	参考 IEC 62321-4:2013+AMD1:2017 CSV Refer to IEC 62321-4:2013+AMD1:2017 CSV	
六价铬 Hexavalent Chromium (Cr(VI))	IEC 62321-7-1:2015	UV-Vis
多溴联苯 Polybrominated Biphenyls (PBBs)	IEC 62321-6:2015	GC-MS
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS
邻苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS

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Test Report

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检测结果 Test Result(s)

测试项目 Tested Item(s)	结果 Result		方法检出限 MDL
	001	002	
铅 Lead (Pb)	N.D.	41 mg/kg	2 mg/kg
镉 Cadmium (Cd)	N.D.	N.D.	2 mg/kg
汞 Mercury (Hg)	N.D.	N.D.	2 mg/kg
六价铬 Hexavalent Chromium (Cr(VI))	N.D. ▼	N.D. ▼	0.10 µg/cm ² (LOQ)

测试项目 Tested Item(s)	结果 Result		方法检出限 MDL
	001		
多溴联苯 Polybrominated Biphenyls (PBBs)			
一溴联苯 Monobromobiphenyl	N.D.		5 mg/kg
二溴联苯 Dibromobiphenyl	N.D.		5 mg/kg
三溴联苯 Tribromobiphenyl	N.D.		5 mg/kg
四溴联苯 Tetrabromobiphenyl	N.D.		5 mg/kg
五溴联苯 Pentabromobiphenyl	N.D.		5 mg/kg
六溴联苯 Hexabromobiphenyl	N.D.		5 mg/kg
七溴联苯 Heptabromobiphenyl	N.D.		5 mg/kg
八溴联苯 Octabromobiphenyl	N.D.		5 mg/kg
九溴联苯 Nonabromobiphenyl	N.D.		5 mg/kg
十溴联苯 Decabromobiphenyl	N.D.		5 mg/kg

测试项目 Tested Item(s)	结果 Result		方法检出限 MDL
	002		
多溴联苯 Polybrominated Biphenyls (PBBs)			
一溴联苯 Monobromobiphenyl	N.D.		5 mg/kg
二溴联苯 Dibromobiphenyl	N.D.		5 mg/kg
三溴联苯 Tribromobiphenyl	N.D.		5 mg/kg
四溴联苯 Tetrabromobiphenyl	N.D.		5 mg/kg
五溴联苯 Pentabromobiphenyl	N.D.		5 mg/kg
六溴联苯 Hexabromobiphenyl	N.D.		5 mg/kg
七溴联苯 Heptabromobiphenyl	N.D.		5 mg/kg
八溴联苯 Octabromobiphenyl	N.D.		5 mg/kg
九溴联苯 Nonabromobiphenyl	N.D.		5 mg/kg
十溴联苯 Decabromobiphenyl	N.D.		5 mg/kg

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测试项目 Tested Item(s)	结果 Result	方法检出限 MDL
	001	
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)		
一溴二苯醚 Monobromodiphenyl ether	N.D.	5 mg/kg
二溴二苯醚 Dibromodiphenyl ether	N.D.	5 mg/kg
三溴二苯醚 Tribromodiphenyl ether	N.D.	5 mg/kg
四溴二苯醚 Tetrabromodiphenyl ether	N.D.	5 mg/kg
五溴二苯醚 Pentabromodiphenyl ether	N.D.	5 mg/kg
六溴二苯醚 Hexabromodiphenyl ether	N.D.	5 mg/kg
七溴二苯醚 Heptabromodiphenyl ether	N.D.	5 mg/kg
八溴二苯醚 Octabromodiphenyl ether	N.D.	5 mg/kg
九溴二苯醚 Nonabromodiphenyl ether	N.D.	5 mg/kg
十溴二苯醚 Decabromodiphenyl ether	N.D.	5 mg/kg

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL
	002	
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)		
一溴二苯醚 Monobromodiphenyl ether	N.D.	5 mg/kg
二溴二苯醚 Dibromodiphenyl ether	N.D.	5 mg/kg
三溴二苯醚 Tribromodiphenyl ether	N.D.	5 mg/kg
四溴二苯醚 Tetrabromodiphenyl ether	N.D.	5 mg/kg
五溴二苯醚 Pentabromodiphenyl ether	N.D.	5 mg/kg
六溴二苯醚 Hexabromodiphenyl ether	N.D.	5 mg/kg
七溴二苯醚 Heptabromodiphenyl ether	N.D.	5 mg/kg
八溴二苯醚 Octabromodiphenyl ether	N.D.	5 mg/kg
九溴二苯醚 Nonabromodiphenyl ether	N.D.	5 mg/kg
十溴二苯醚 Decabromodiphenyl ether	N.D.	5 mg/kg

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测试项目 Tested Item(s)	结果 Result	方法检出限 MDL
	001	
邻苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)		
邻苯二甲酸二丁酯 Dibutyl phthalate (DBP) CAS#:84-74-2	N.D.	50 mg/kg
邻苯二甲酸丁基苄基酯 Butyl benzyl phthalate (BBP) CAS#:85-68-7	N.D.	50 mg/kg
邻苯二甲酸二(2-乙基)己酯 Di-(2-ethylhexyl) phthalate (DEHP) CAS#:117-81-7	N.D.	50 mg/kg
邻苯二甲酸二异丁酯 Diisobutyl phthalate (DIBP) CAS#:84-69-5	N.D.	50 mg/kg

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL
	002	
邻苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)		
邻苯二甲酸二丁酯 Dibutyl phthalate (DBP) CAS#:84-74-2	N.D.	50 mg/kg
邻苯二甲酸丁基苄基酯 Butyl benzyl phthalate (BBP) CAS#:85-68-7	N.D.	50 mg/kg
邻苯二甲酸二(2-乙基)己酯 Di-(2-ethylhexyl) phthalate (DEHP) CAS#:117-81-7	N.D.	50 mg/kg
邻苯二甲酸二异丁酯 Diisobutyl phthalate (DIBP) CAS#:84-69-5	N.D.	50 mg/kg

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样品/部位描述 Sample/Part Description

001 金属基材 Metal base
002 银白色镀层 Silver-white plating

备注: 对于检测铅, 镉, 汞之样品已消解完全。
-N.D. = 未检出 (小于方法检出限或定量限)
-mg/kg = ppm = 百万分之一
-LOQ = 定量限, 六价铬的定量限为 0.10 $\mu\text{g}/\text{cm}^2$
-▼六价铬浓度小于 0.10 $\mu\text{g}/\text{cm}^2$, 样品未检出六价铬。

Remark: The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.

-MDL = Method Detection Limit
-N.D. = Not Detected (<MDL or LOQ)
-mg/kg = ppm = parts per million
-LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 $\mu\text{g}/\text{cm}^2$
-▼The sample is negative for Cr(VI) – The Cr(VI) concentration is below 0.10 $\mu\text{g}/\text{cm}^2$. The coating is considered a non-Cr(VI) based coating.

注释: -本报告中的数据结果供科研、教学、企业内部质量控制、企业产品研发等目的用。
-本报告于原报告(报告编号 A2220186128101E)基础上修改了样品 002 铅结果的表述方式和修改了“样品检测日期”。本报告替换原报告 A2220186128101E, 自本报告签发之日起, 原报告 A2220186128101E 作废。

Note: -The testing data and result(s) in this report is(are) just for scientific research, education, internal quality control and product development etc.
-This testing report revised the test result expression of Lead(Pb) of sample 002 and revised “Testing Period ” based on the original report of No.A2220186128101E. This testing report displaces the original one which was invalid since the date of this testing report released.

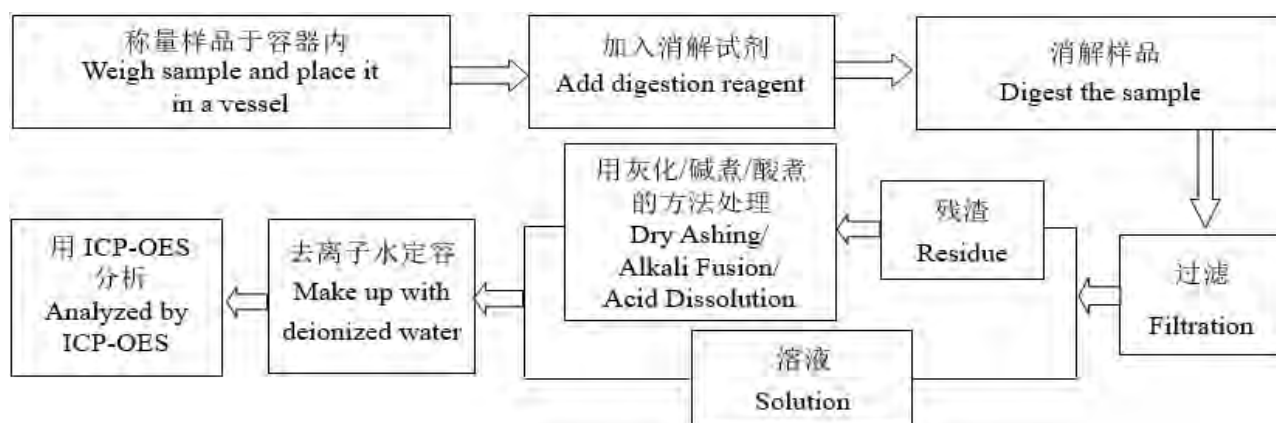
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检测流程 Test Process

1. 铅 Lead (Pb), 镉 Cadmium (Cd)

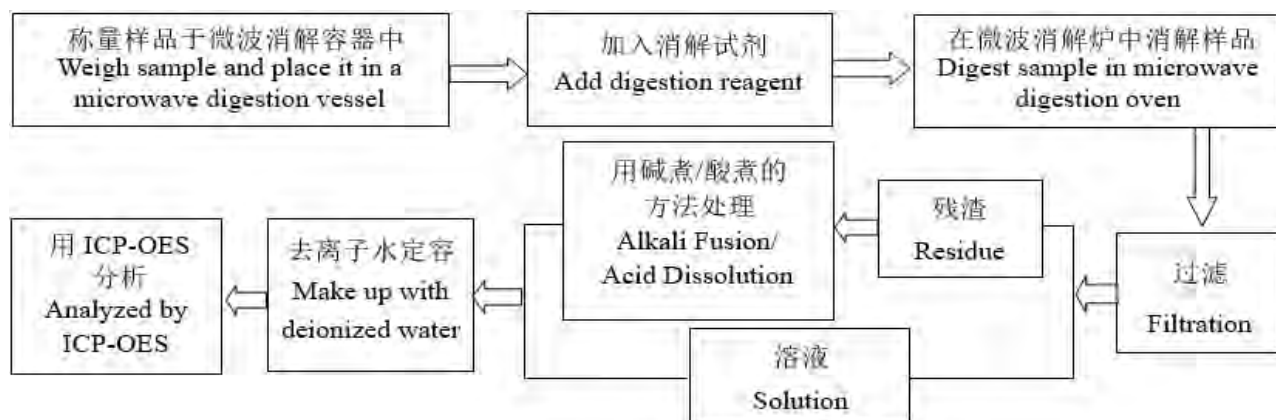


2. 镉 Cadmium (Cd)



3. 汞 Mercury (Hg)

(1) IEC 62321-4:2013+AMD1:2017 CSV



检测报告 Test Report

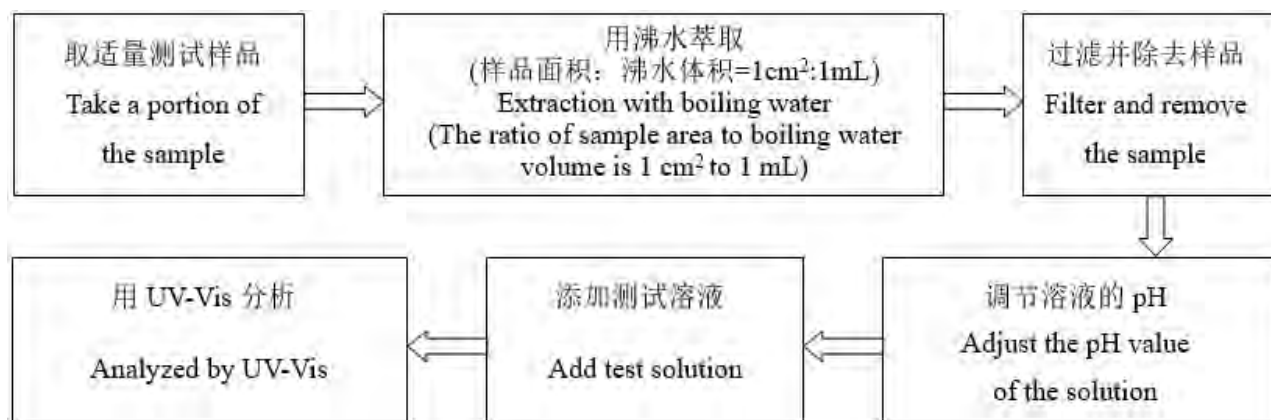
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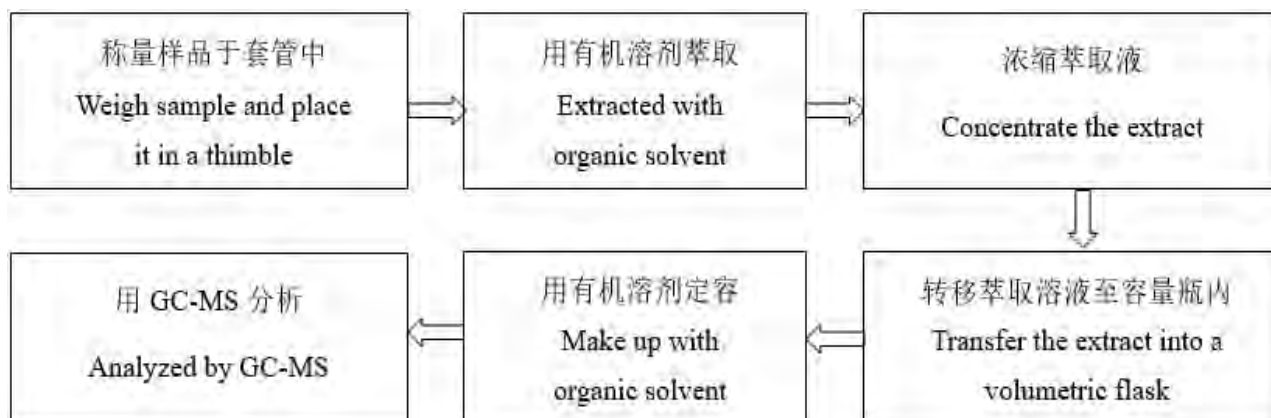
(2) 参考 IEC 62321-4:2013+AMD1:2017 CSV Refer to IEC 62321-4:2013+AMD1:2017 CSV



4. 六价铬 Hexavalent Chromium (Cr(VI))



5. 多溴联苯 Polybrominated Biphenyls (PBBs), 多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)

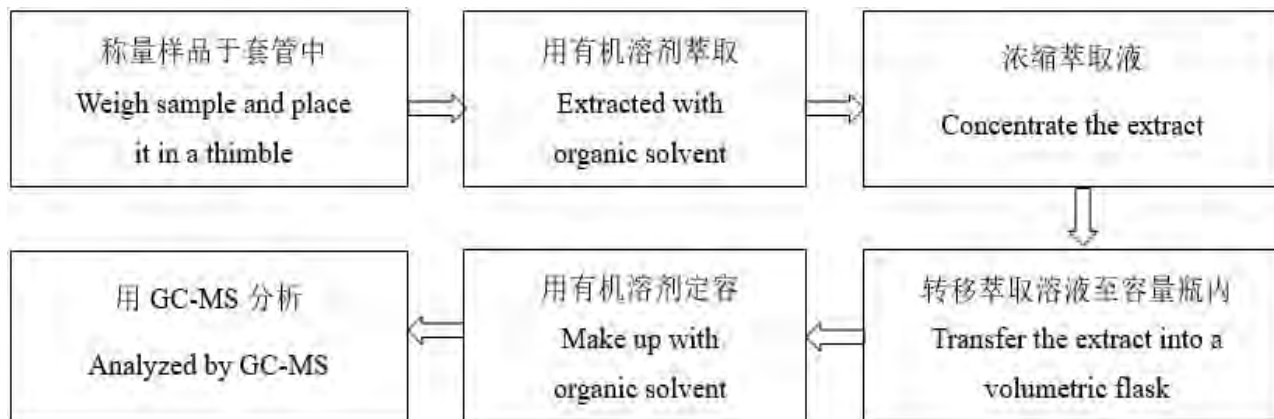


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6. 邻苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)



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样品图片

Photo(s) of the sample(s)

001-002



声明 Statement:

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This report is considered invalid without approved signature, special seal and the seal on the perforation;

2. 报告抬头公司名称及地址、样品及样品信息由申请者提供, 申请者应对其真实性负责, CTI 未核实其真实性;

The Company Name shown on Report and Address, the sample(s) and sample information was/were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified;

3. 本报告检测结果仅对受测样品负责;

The result(s) shown in this report refer(s) only to the sample(s) tested;

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*** 报告结束 ***

*** End of Report ***

Test Report

No. SHAEC2203753901

Date: 10 Mar 2022

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Client Name : COLORANT CHROMATICS TRADING(SHANGHAI)CO.,LTD

Client Address : 2F,BLOCK C,VI-HUB@JINQIAO,200 JINSU ROAD,PUDONG,SHANGHAI

Sample Name : FEP Colormasterbatch

Lot No. : 6952666

Client Ref. Information : 100.00/102.00/103.00/108.00/113.00/142.00/143.00/152.00/153.00/158.00/190.00/192.00/193.00/198.00/S203.0/S243.0/S245.0/STR1625/STR1962

The above sample(s) and information were provided by the client.

SGS Job No. : SP22-005867 - SH

Date of Sample Received : 04 Mar 2022

Testing Period : 04 Mar 2022 - 10 Mar 2022

Test Requested : Selected test(s) as requested by client.

Test Method : Please refer to next page(s).

Test Results : Please refer to next page(s).

Conclusion : Based on the performed tests on submitted sample(s), the results of Cadmium, Lead, Mercury, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Carol Luo

Carol Luo
Approved Signatory



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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA22-037539.001	Black solid pellet

Remarks :

- (1) 1 mg/kg = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected (< MDL)
- (4) "-" = Not Regulated

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method : With reference to IEC 62321-4:2013+AMD1:2017, IEC62321-5:2013, IEC62321-7-2:2017, IEC 62321-6:2015 and IEC62321-8:2017, analyzed by ICP-OES, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	8	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND



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Test Report

No. SHAEC2203753901

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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND
Di-butyl Phthalate (DBP)	1000	mg/kg	50	ND
Benzyl Butyl Phthalate (BBP)	1000	mg/kg	50	ND
Di-2-Ethyl Hexyl Phthalate (DEHP)	1000	mg/kg	50	ND
Diisobutyl Phthalates (DIBP)	1000	mg/kg	50	ND

Notes :

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863. IEC 62321 series is equivalent to EN 62321 series
https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25
- (2) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.



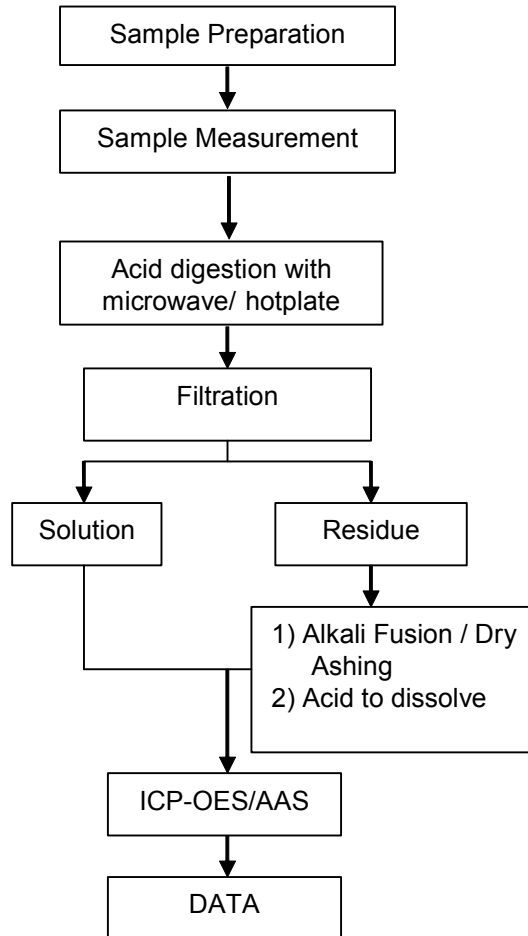
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Elements (IEC62321) Testing Flow Chart

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

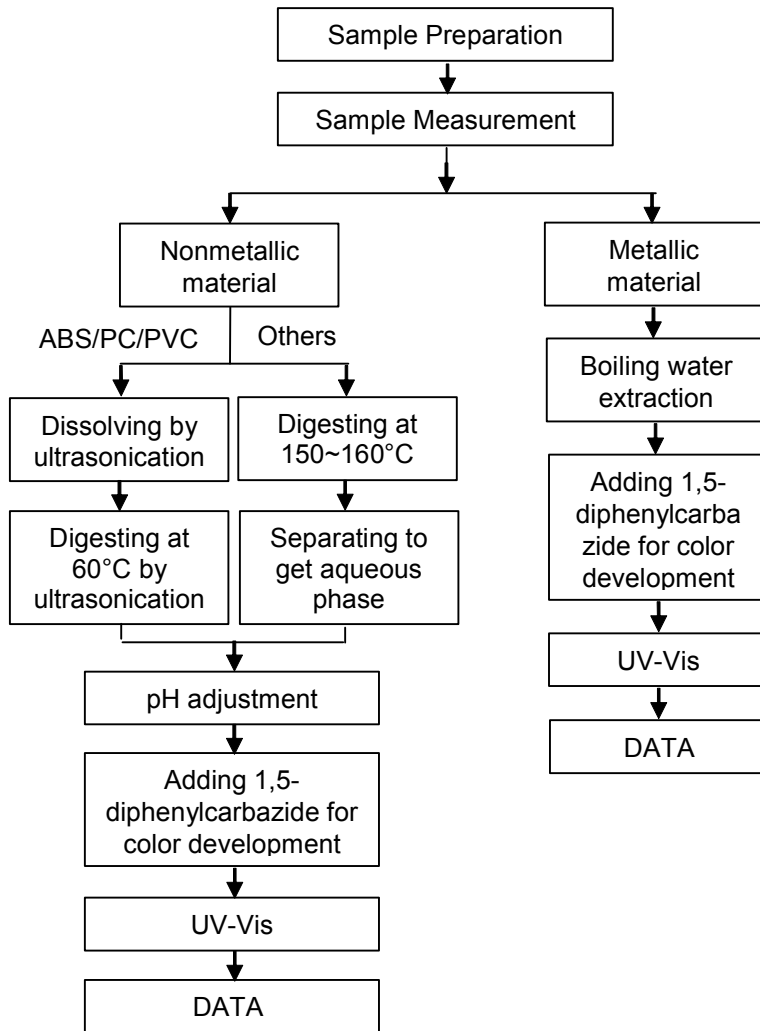


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Hexavalent Chromium (Cr(VI)) Testing Flow Chart



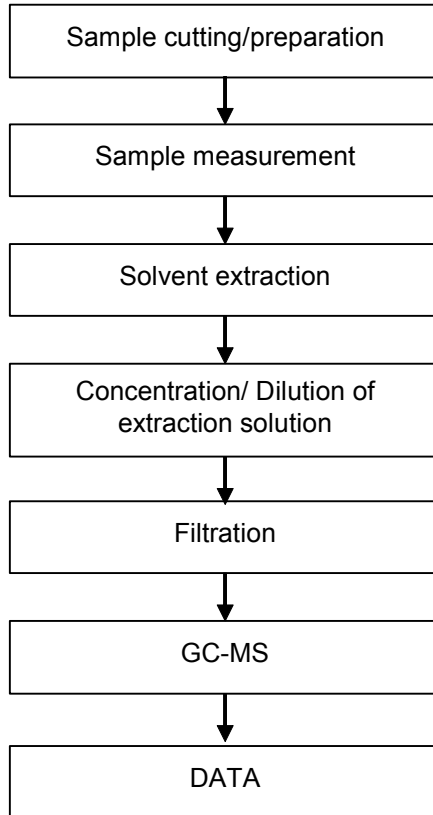
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PBBs/PBDEs Testing Flow Chart

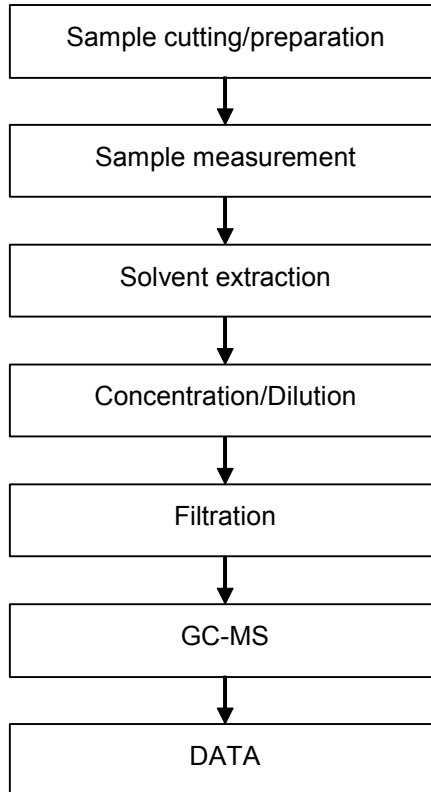


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Phthalates Testing Flow Chart



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Sample photo:



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Test Report

No. SHAEC2200415801

Date: 15 Jan 2022

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DAIKIN FLUORO CHEMICALS(CHINA) CO., LTD.

NO.8 JINYU ROAD(WEST) ADVANCED MATERIALS INDUSTRIAL PARK,CHANGSHU,JIANGSU
215522, CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : NEOFロン FEP

SGS Job No. : SP22-000512 - SH

Model No. : NP-101

Date of Sample Received : 07 Jan 2022

Testing Period : 07 Jan 2022 - 15 Jan 2022

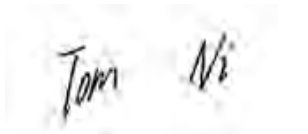
Test Requested : Selected test(s) as requested by client.

Test Method : Please refer to next page(s).

Test Results : Please refer to next page(s).

Conclusion : Based on the performed tests on submitted sample(s), the results of Cadmium, Lead, Mercury, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.



Tom Ni
Approved Signatory



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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA22-004158.001	Translucent solid pellet

Remarks :

- (1) 1 mg/kg = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected (< MDL)
- (4) "-" = Not Regulated

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method : With reference to IEC 62321-4:2013+AMD1:2017, IEC62321-5:2013, IEC62321-7-2:2017, IEC 62321-6:2015 and IEC62321-8:2017, analyzed by ICP-OES, Hg analyzer, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	8	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND



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Test Report

No. SHAEC2200415801

Date: 15 Jan 2022

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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND
Di-butyl Phthalate (DBP)	1000	mg/kg	50	ND
Benzyl Butyl Phthalate (BBP)	1000	mg/kg	50	ND
Di-2-Ethyl Hexyl Phthalate (DEHP)	1000	mg/kg	50	ND
Diisobutyl Phthalates (DIBP)	1000	mg/kg	50	ND

Notes :

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863. IEC 62321 series is equivalent to EN 62321 series
https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25
- (2) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.

Element(s)

Test Method : With reference to US EPA 3052:1996, analysis was performed by ICP-OES.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Phosphorus (P)	mg/kg	20	ND*
Beryllium (Be)	mg/kg	5	ND*
Cobalt (Co)	mg/kg	5	ND*

Notes :

- *The reported result is for reference only.

Element(s)

Test Method : With reference to ASTM D 4004-06(2017), analysis was performed by ICP-OES.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Antimony (Sb)	mg/kg	50	ND



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Alkanes C10-C13, chloro (short-chain chlorinated paraffins) (SCCP)

Test Method : With reference to ISO 18219: 2015, analysis was performed by GC-NCI-MS

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Alkanes C10-C13, chloro (short-chain chlorinated paraffins) (SCCP)	mg/kg	50	ND

Hexabromocyclododecane (HBCDD/HBCD)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by GC-MS.

<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Hexabromocyclododecane (HBCDD/HBCD)	25637-99-4/	mg/kg	10	ND
	3194-55-6			

Asbestos

Test Method : With reference to NIOSH 9000:2015 and ISO 22262-1:2012, analysis was performed by X-ray diffractometer (XRD) and Polarized light microscope (PLM).

<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Actinolite	77536-66-4	%	0.1	Negative
Amosite	12172-73-5	%	0.1	Negative
Anthophyllite	77536-67-5	%	0.1	Negative
Chrysotile	12001-29-5	%	0.1	Negative
	132207-32-0			
Crocidolite	12001-28-4	%	0.1	Negative
Tremolite	77536-68-6	%	0.1	Negative



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Notes :

(1) Negative = the absence of asbestos, Positive = the presence of asbestos.

Tetrabromobisphenol A (TBBP-A)

Test Method : With reference to US EPA 3540C: 1996, analysis was performed by GC-MS/LC-MS.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Tetrabromobisphenol A (TBBP-A)	mg/kg	10	ND

Phthalates Content

Test Method : With reference to EN 14372:2004, analysis was performed by GC-MS.

<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Diisononyl Phthalate (DINP)	28553-12-0 /68515-48-0	%	0.01	ND
Diisodecyl Phthalate (DIDP)	26761-40-0 /68515-49-1	%	0.01	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	%	0.003	ND
Diisooctyl Phthalate (DiOP)	27554-26-3	%	0.01	ND
Dimethyl Phthalate (DMP)	131-11-3	%	0.003	ND
Di-n-pentyl Phthalates (DnPP)	131-18-0	%	0.003	ND
Diethyl Phthalate (DEP)	84-66-2	%	0.003	ND
Dicyclohexyl Phthalate (DCHP)	84-61-7	%	0.003	ND
Dipropyl Phthalate (DPrP)	131-16-8	%	0.003	ND
Dinonyl Phthalate (DNP)	84-76-4	%	0.003	ND
Dibenzyl Phthalate (DBzP)	523-31-9	%	0.003	ND
Diphenyl Phthalate (DPhP)	84-62-8	%	0.003	ND
Bis(2-methoxyethyl) Phthalate (DMEP)	117-82-8	%	0.003	ND
Diisoheptyl phthalate (DIHP)	71888-89-6	%	0.01	ND
1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	68515-42-4	%	0.01	ND
Di(2-ethylhexyl)adipate(DEHA)	103-23-1	%	0.003	ND
Diisopentylphthalate (DIPP)	605-50-5	%	0.003	ND
Di-n-hexyl Phthalate (DnHP)	84-75-3	%	0.003	ND

Polycyclic aromatic hydrocarbons (PAHs)



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Test Method : With reference to AfPS GS 2019:01 PAK, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	001
Benzo(a)pyrene(BaP)	mg/kg	0.1	ND
Benzo(e)pyrene(BeP)	mg/kg	0.1	ND
Benzo(a)anthracene(BaA)	mg/kg	0.1	ND
Benzo(b)fluoranthene(BbF)	mg/kg	0.1	ND
Benzo(j)fluoranthene(BjF)	mg/kg	0.1	ND
Benzo(k)fluoranthene(BkF)	mg/kg	0.1	ND
Chrysene(CHR)	mg/kg	0.1	ND
Dibenzo(a,h)anthracene(DBA)	mg/kg	0.1	ND
Benzo(g,h,i)perylene(BPE)	mg/kg	0.1	ND
Indeno(1,2,3-c,d)pyrene(IPY)	mg/kg	0.1	ND
Phenanthrene(PHE)	mg/kg	0.1	ND
Pyrene(PYR)	mg/kg	0.1	ND
Anthracene(ANT)	mg/kg	0.1	ND
Fluoranthene(FLT)	mg/kg	0.1	ND
Sum of Phenanthrene(PHE), Pyrene(PYR), Anthracene(ANT), Fluoranthene(FLT)	mg/kg	-	ND
Naphthalene(NAP)	mg/kg	0.1	ND
Sum of 15 PAHs	mg/kg	-	ND



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AfPS (German commission for Product Safety) : PAHs requirements

Parameter Unit : mg/kg	Category 1	Category 2		Category 3	
	Materials intended to be placed in the mouth, or materials coming into long-term contact with skin (more than 30s) during the intended use -in toys according to Directive 2009/48/EC or -for the use by children ^{a,b} up to 3 years of age.	a. use by children	b. other consumer products	a. use by children	b. other consumer products
Benzo(a)pyrene (BaP)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(e)pyrene (BeP)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(a)anthracene (BaA)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(b)fluoranthene (BbF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(j)fluoranthene (BjF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(k)fluoranthene (BkF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysene (CHR)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo(a,h)anthracene (DBA)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(g,h,i)perylene (BPE)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno(1,2,3-cd)pyrene (IPY)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Phenanthrene (PHE), pyrene (PYR), anthracene (ANT), fluoranthene (FLT)	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum
Naphthalene (NAP)	< 1	< 2		< 10	
Sum of 15 PAHs	< 1	< 5	< 10	< 20	< 50

Note:

^a A "Child" is legally defined as a person before reaching the age of 14 years.

^b Use by children includes both active and passive contact by children.

^c Definition "short-term repetitive contact" taken from REACH Annex XVII entry 50 amendment (Regulation (EC) No. 1272/2013)

^d According to the definition of the German Product Safety Act (ProdSG) (chapter 1 Article 2 No. 28) "foreseeable use" shall mean the use of a product in a manner that the person placing it on the market, has not intended, but which could be reasonably foreseeable.

Remark: The German committee on Product Safety (AfPS) published a new PAHs document (AfPS GS 2019:01 PAK) on April 10, 2020, which will be binding for the issue of GS mark certificate from July 1, 2020.

Bisphenol-A

Test Method : Extraction by organic solvent, analysis by HPLC-DAD-MS.

Test Item(s)

Bisphenol-A

Unit
mg/kg

MDL
1

001
ND



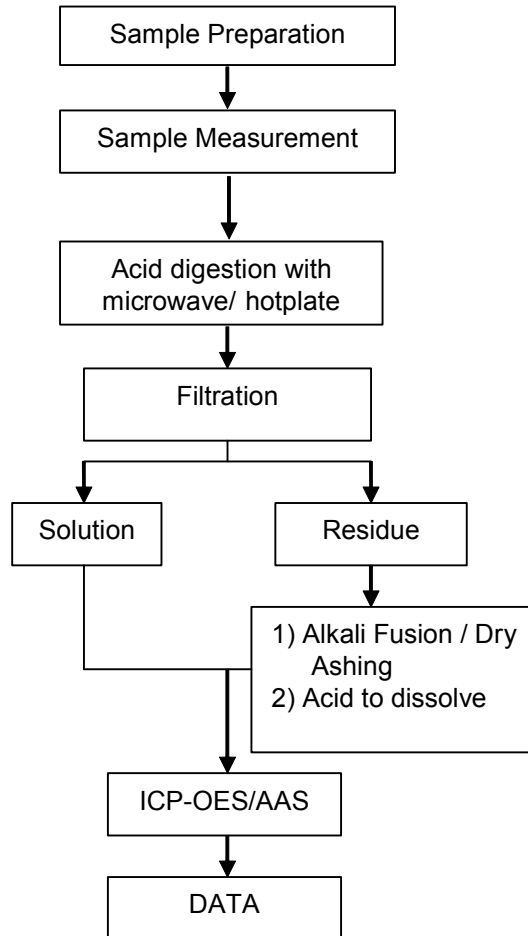
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Elements (IEC62321) Testing Flow Chart

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

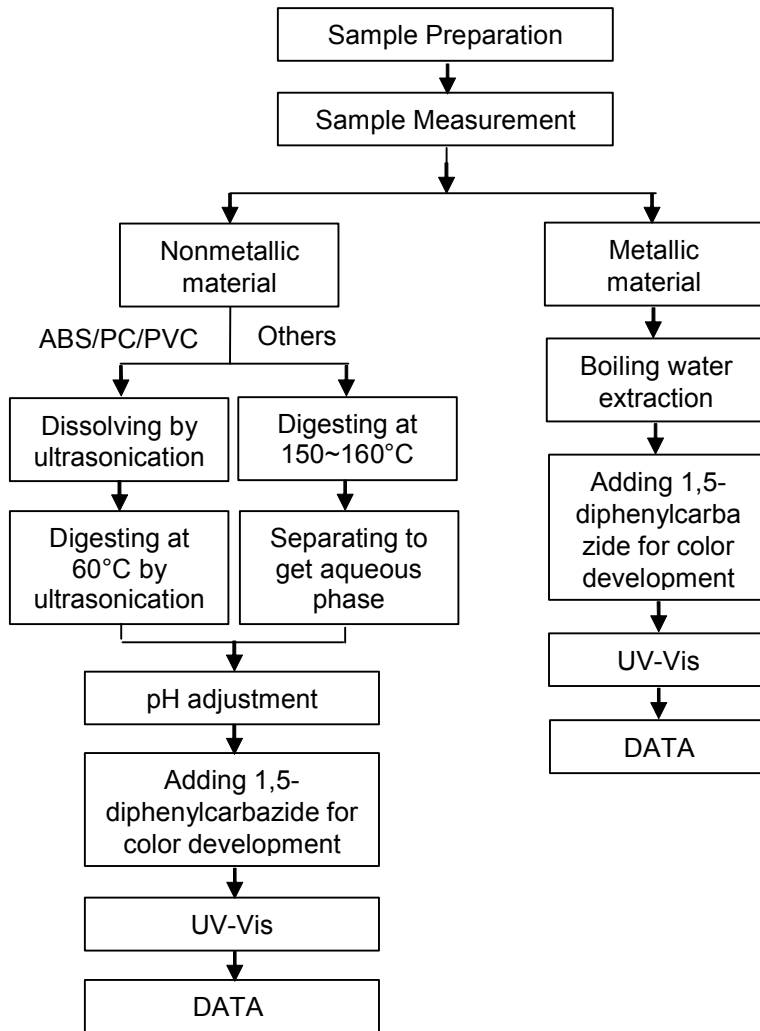


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Hexavalent Chromium (Cr(VI)) Testing Flow Chart



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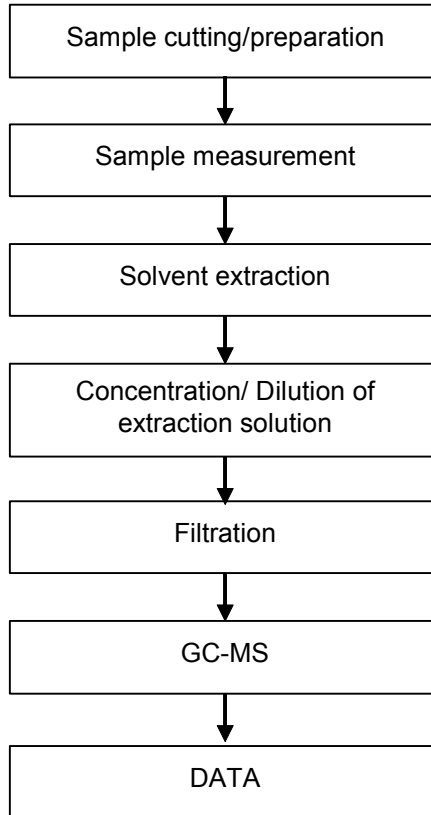
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PBBs/PBDEs Testing Flow Chart

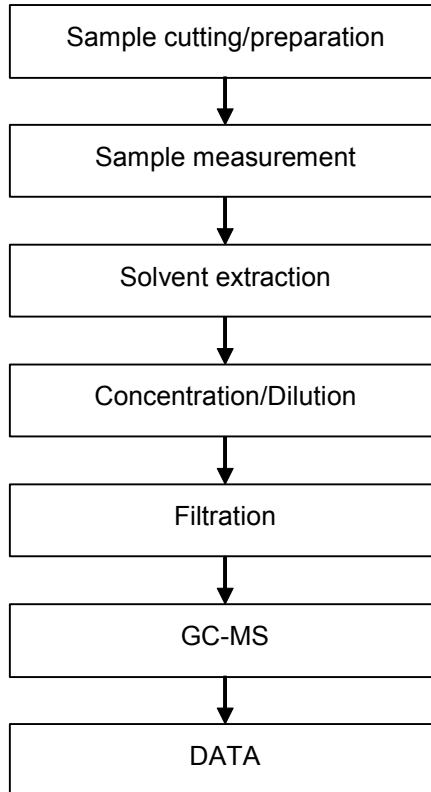


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Phthalates Testing Flow Chart

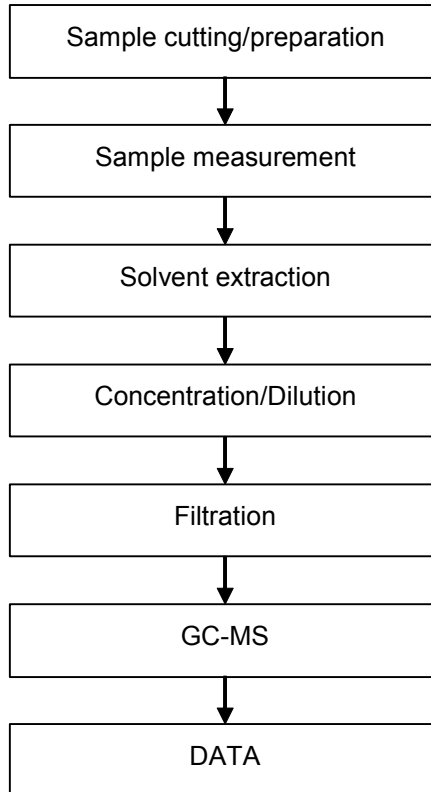


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HBCDD Testing Flow Chart

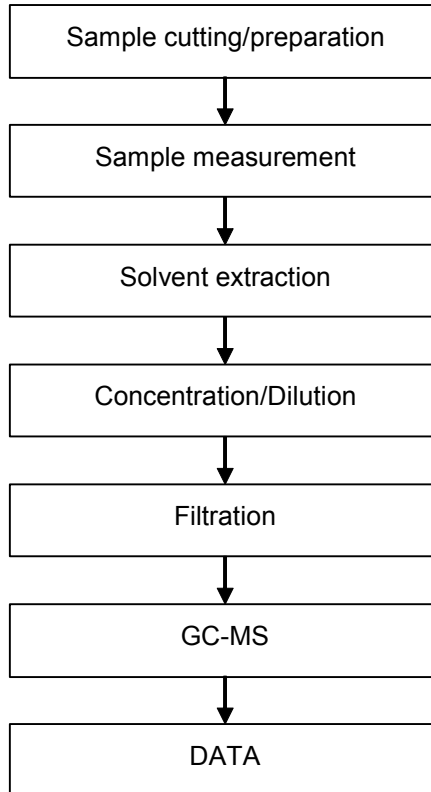


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PAHs Testing Flow Chart

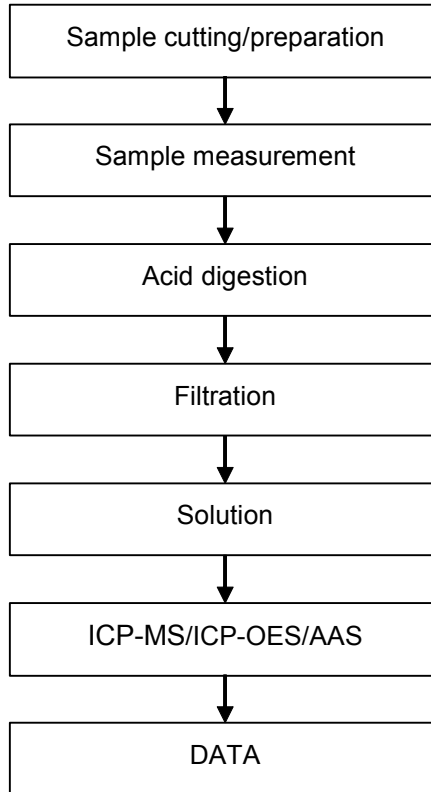


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Elements Testing Flow Chart

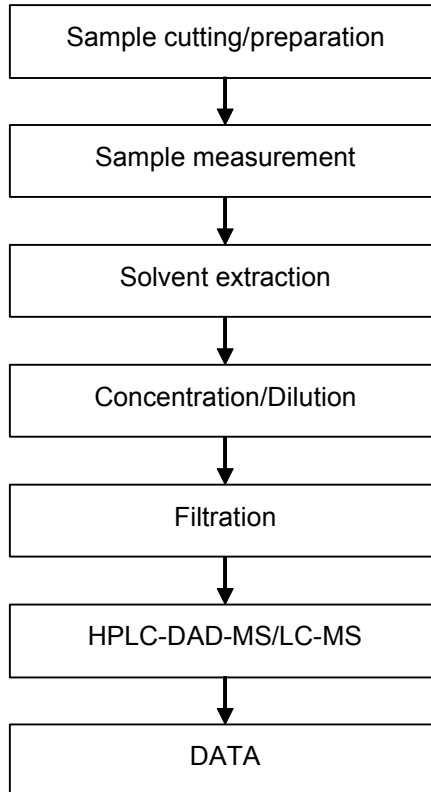


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BPA Testing Flow Chart

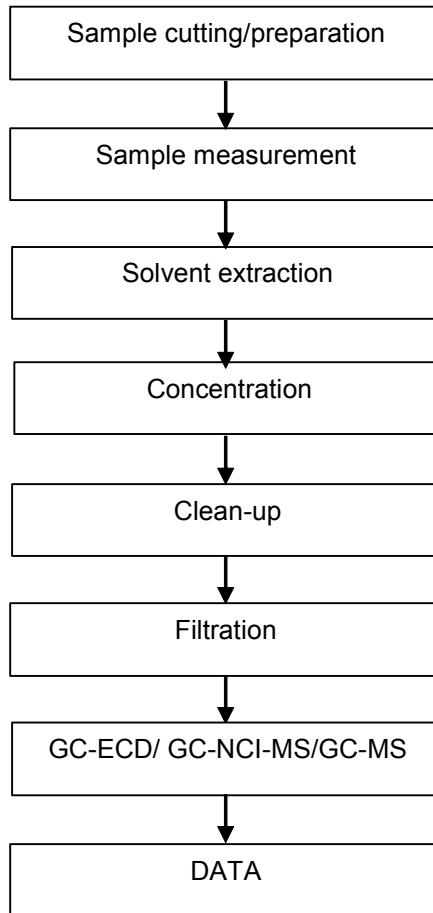


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Chlorinated Paraffin Testing Flow Chart

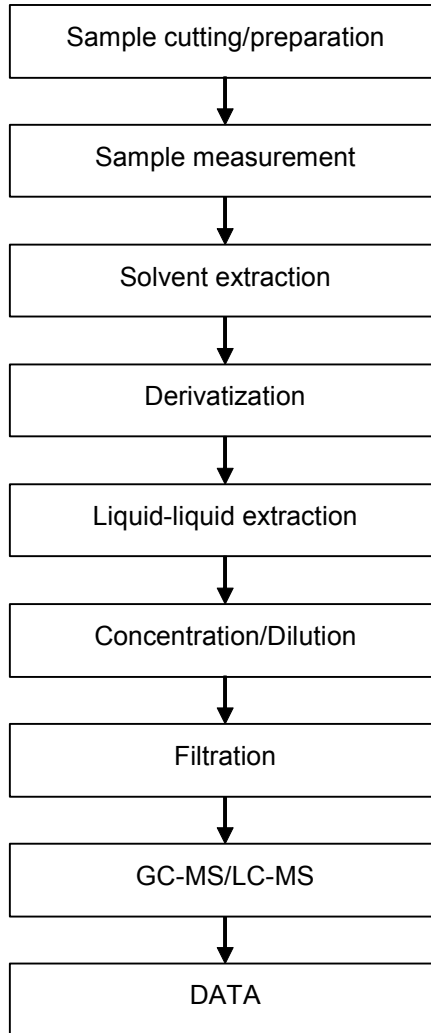


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TBBP-A Testing Flow Chart

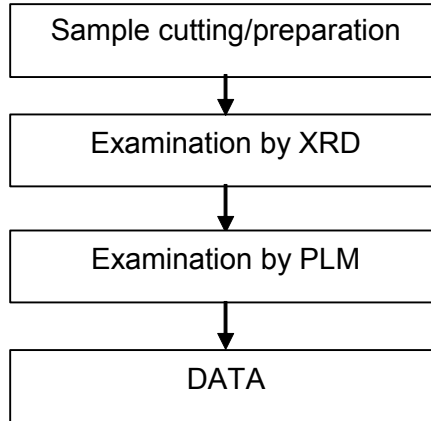


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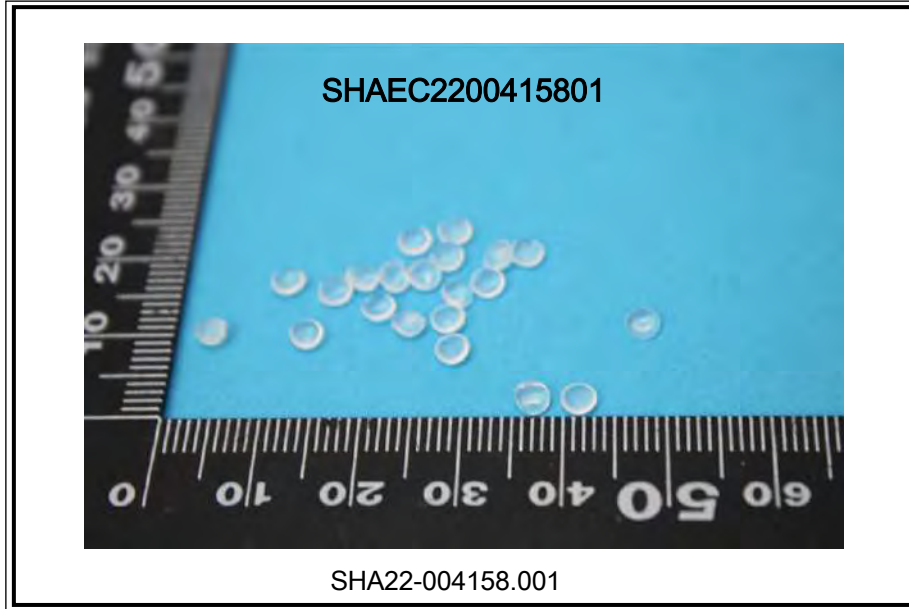
Asbestos Testing Flow Chart



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