詠業科技股份有限公司
Unictron Technologies Corp.

WT217-01C

APPROVAL SHEET

RoHS compliance

CUSTOMER : 威潤科技股份有限公司
ISSUE DATE : 2021.12.13

APPROVED			
COMPANY	**APPROVED BY**	**CHECK BY**	**PREPARED BY**
	Herbert Chou	**Mike Yang**	**Eva Chou**
APPROVAL NO :	**H2U38D1E1B0100**		
MODEL :	**WiFi/Bluetooth Chip Antenna(321613-CW324S)**		
Customer NO :	**EL07-0013**		

3.2 x 1.6 x 1.3 (mm) WiFi / Bluetooth Chip Antenna (CW324S)

Engineering Specification

1. Product Number

H	2	U	3	8	D	1	E	1	B	0	1	0	0

2. Features

*Stable and reliable in performances
*Low profile, compact size
*RoHS 2.0 compliance
*SMT processes compatible
*AEC-Q200 compliant

3. Applications

*ISM 2.4 GHz applications
*ZigBee/BLE applications
*Bluetooth earphone systems
*Hand-held devices when WiFi / Bluetooth functions are needed, e.g., Smartphones
*IEEE802.11 b/g/n
*Wireless PCMCIA cards or USB dongles

4. Description

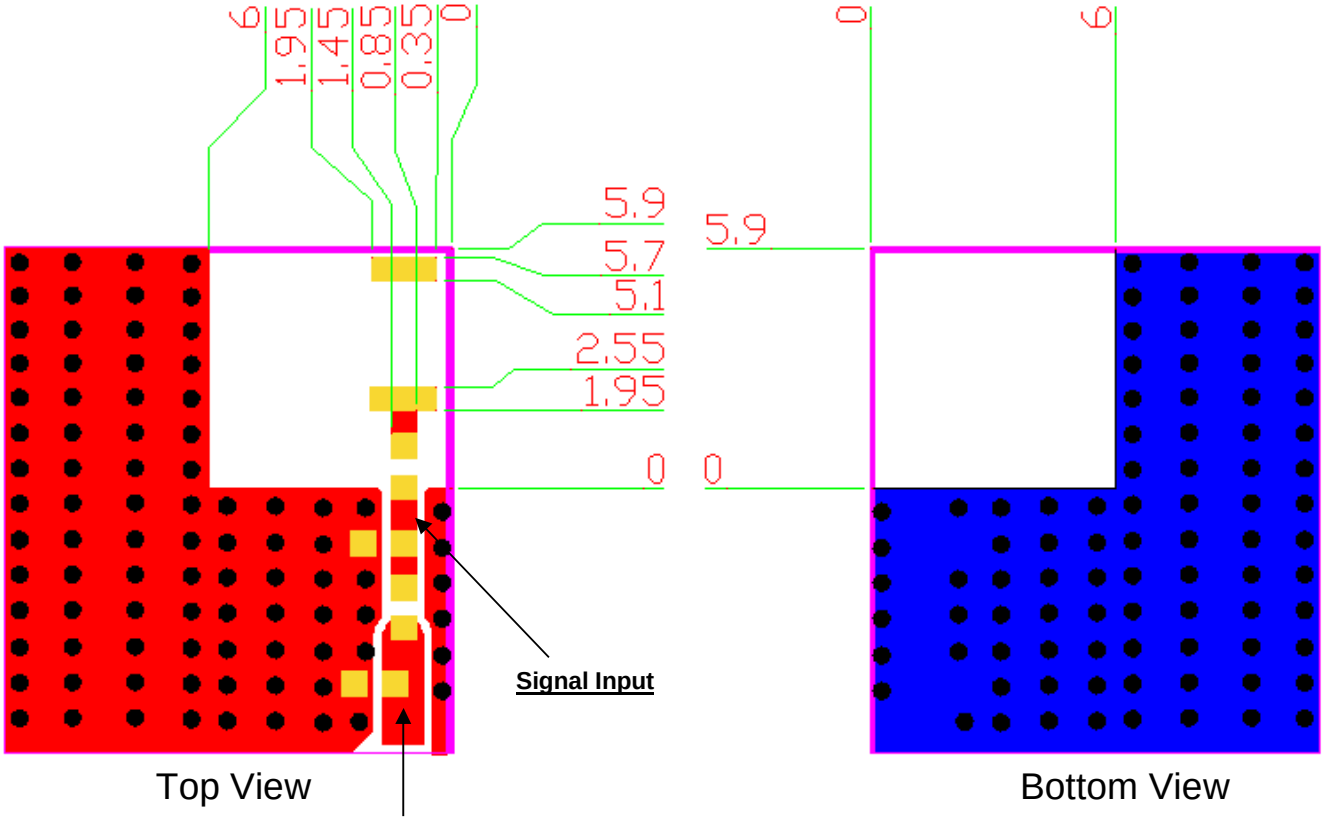
Unictron's CW324S chip antenna is designed for ISM 2.4GHz applications, covering frequencies 2400~2500 MHz. Fabricated with proprietary design and processes, CW324S shows excellent performance and is fully compatible with SMT processes, which can decrease the assembly cost and improve the device's quality and consistency.

5. Layout Guide & Electrical Specifications

5-1. Layout Guide (unit：mm)

Solder Land Pattern:

The solder land pattern (gold marking areas) is shown below. Recommendation on matching circuit will be provided according to the customer's installation conditions.



Transmission Line with 50Ω Impedance Characteristic

5-2. Electrical Specifications (Evaluation Board Dimensions: 40 x 40 mm^2)

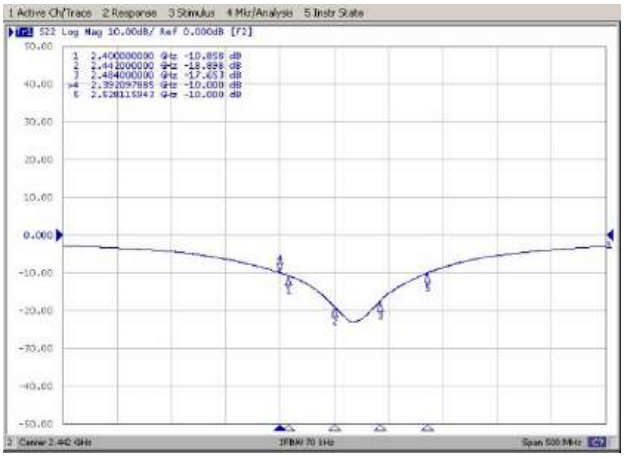
5-2-1. Electrical Table

Characteristics		Specifications	Unit
Outline Dimensions		3.2 x 1.6 x 1.3	mm
Working Frequency		2400 ~ 2500	MHz
VSWR(@ center frequency)*		2 Max.	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@2442 MHz)	1.5 (typical**)	dBi
Efficiency		56.3 (typical**)	%

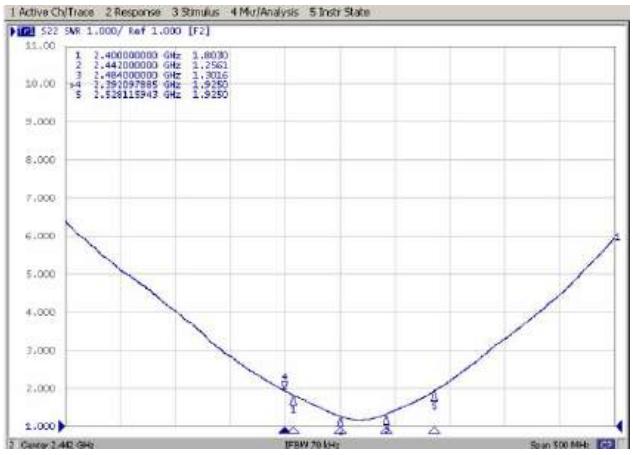
*Center frequency means the frequency with the lowest value in return loss of the chip antenna on the evaluation board.
**A typical value is for reference only, not guaranteed.

5-2-2. Return Loss & VSWR

Return Loss (S_{11})

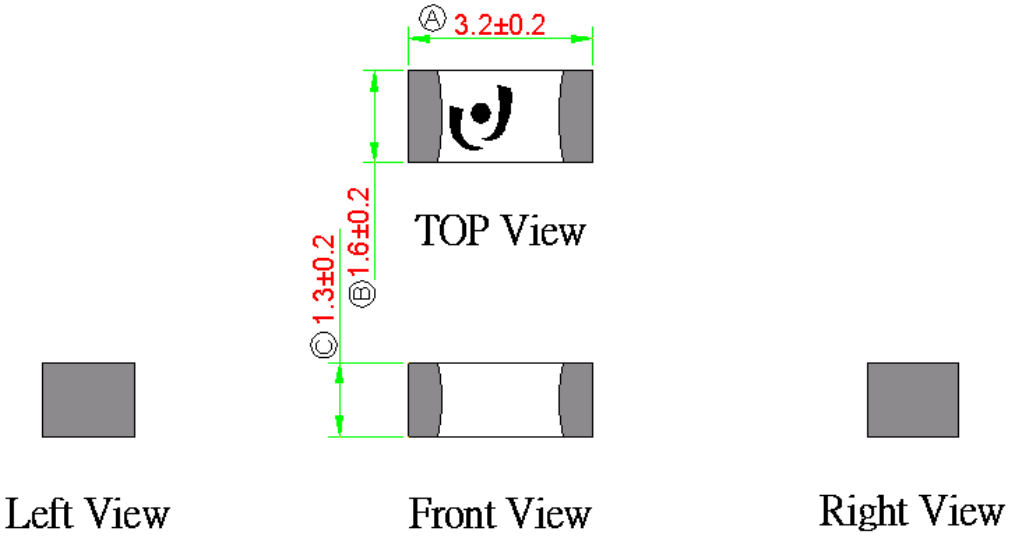


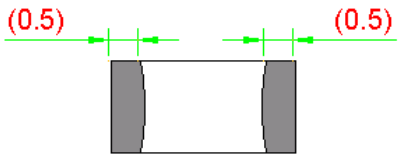
VSWR (S_{11})



6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

6-1. Antenna Dimensions

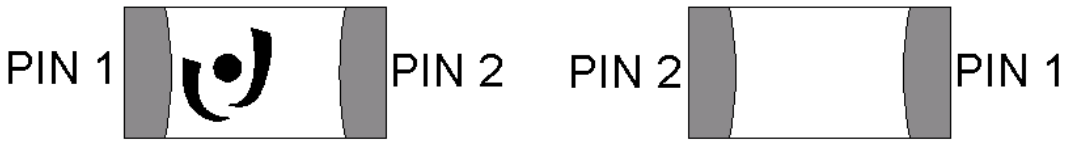




Bottom View

NOTE:
1.All materials are RoHS 2.0 compliant.
2."Ⓐ~Ⓒ" Critical Dimensions.
3."( )" Reference Dimensions.

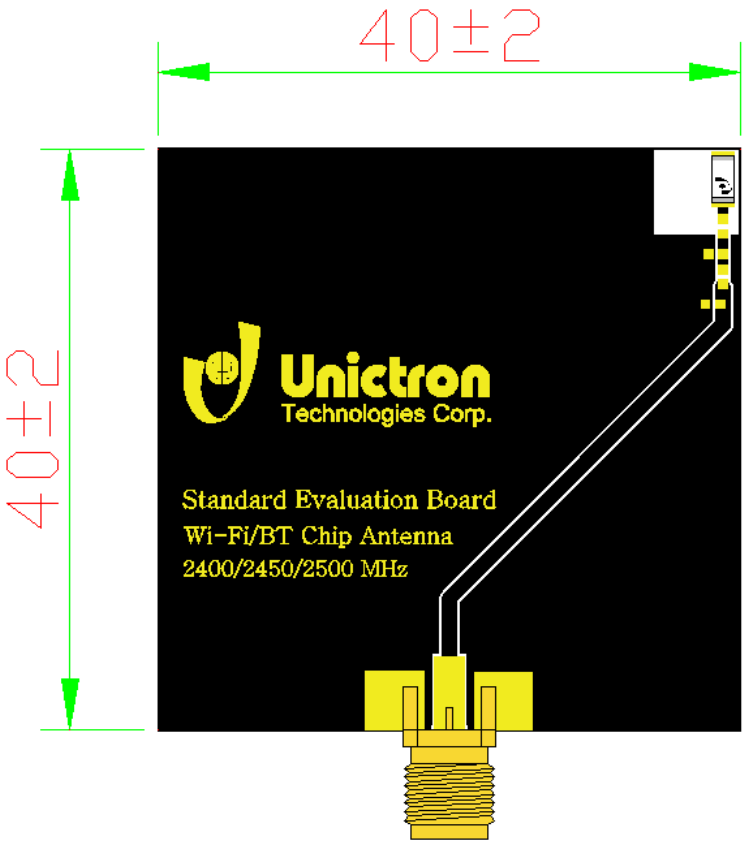
PIN Definitions



TOP View Bottom View

PIN	1	2
Soldering PAD	Signal	N/C

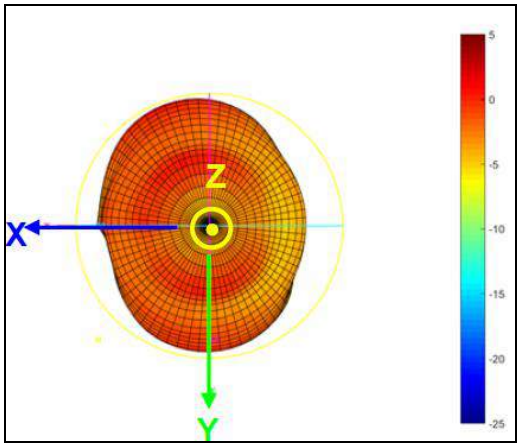
6-2. Evaluation Board with Antenna

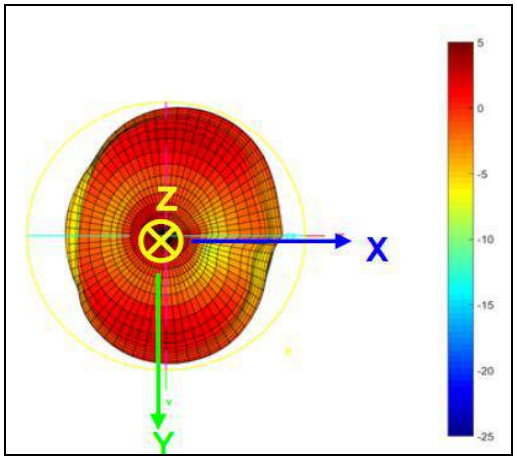


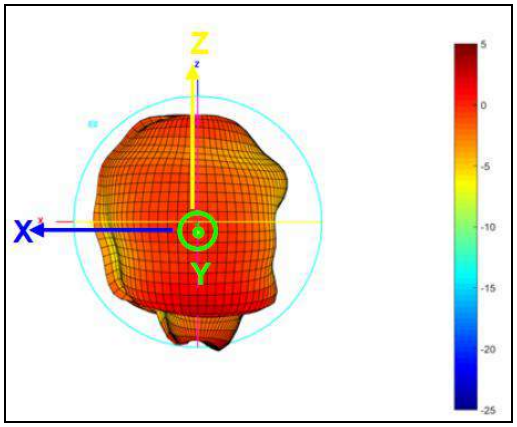
Unit: mm

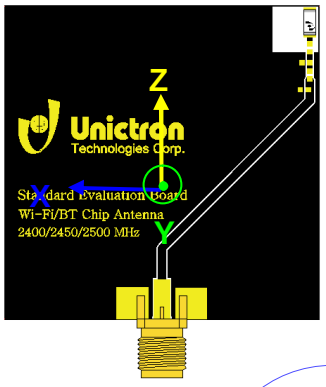
7. Radiation Pattern (with 40 x 40 mm² Evaluation Board)

7-1. 3D Gain Radiation Pattern @ 2442 MHz (unit: dBi)





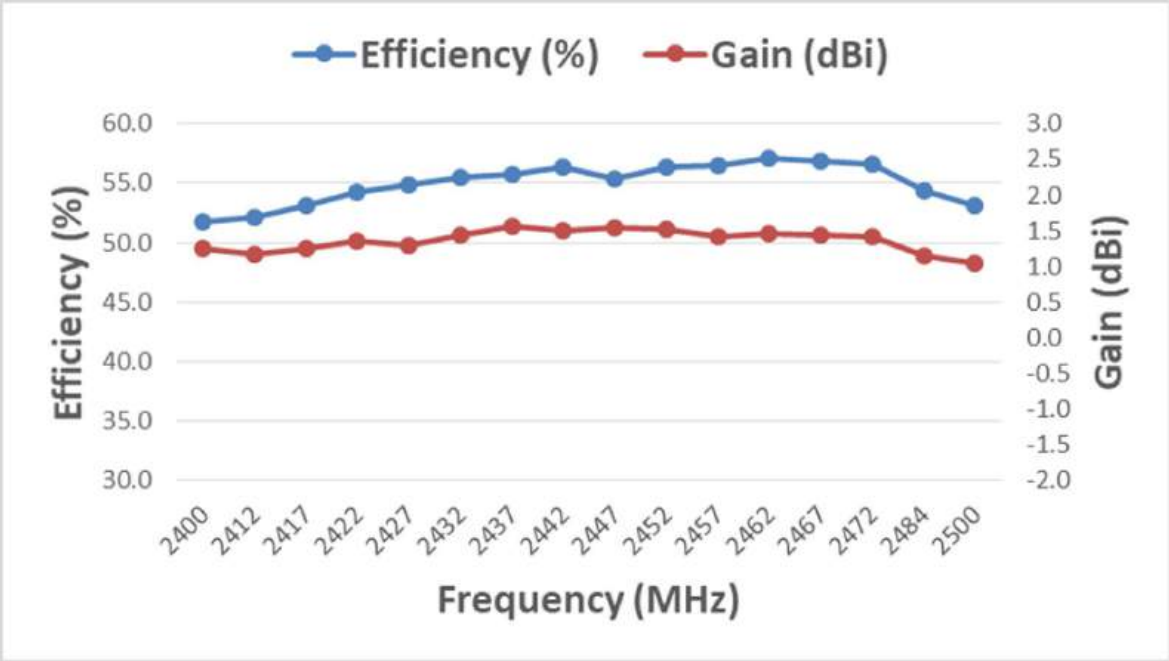




7-2. 3D Efficiency Table

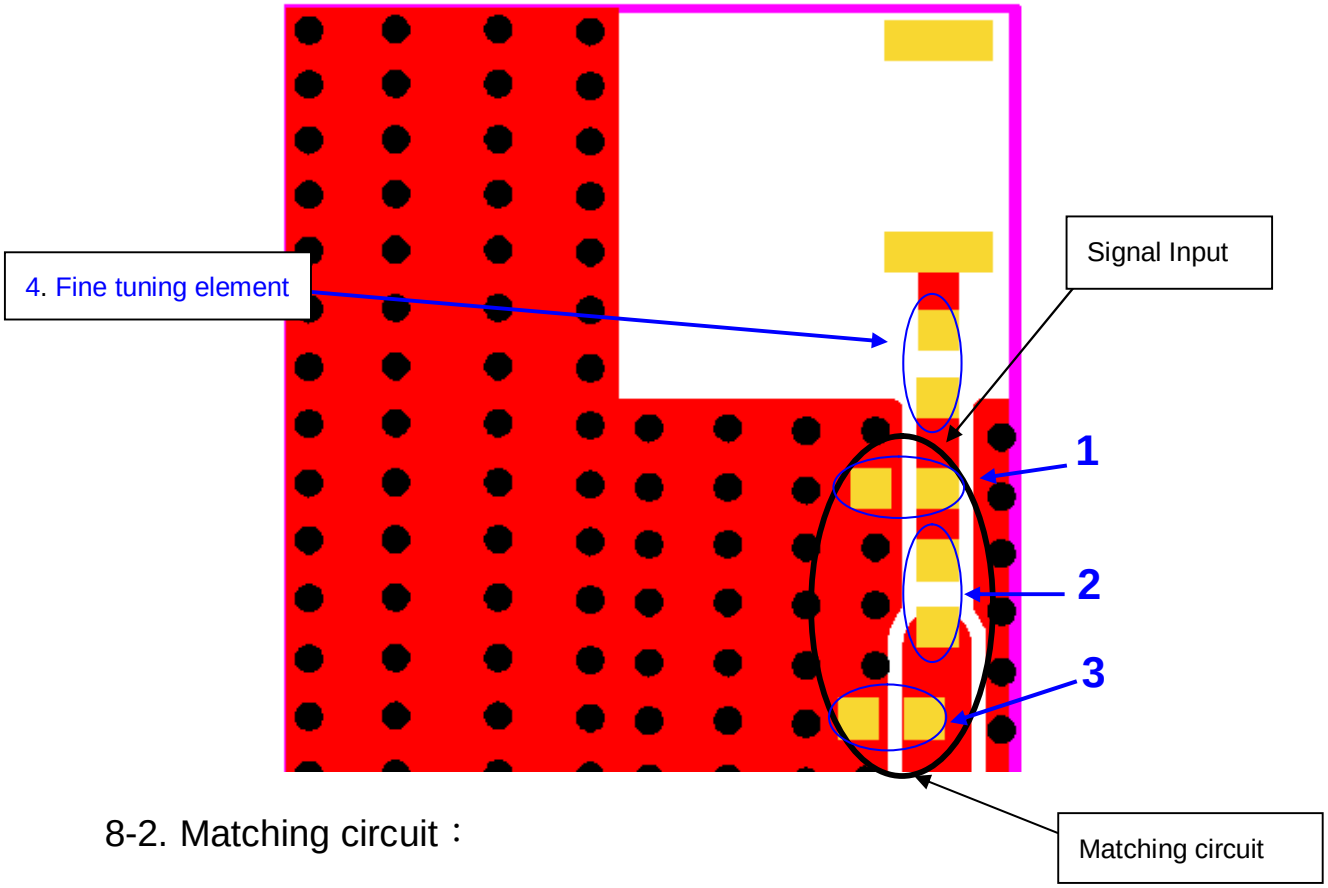
Frequency(MHz)	2400	2412	2417	2422	2427	2432	2437	2442	2447	2452	2457	2462	2467	2472	2484	2500
Efficiency(dB)	-2.9	-2.8	-2.7	-2.7	-2.6	-2.6	-2.5	-2.5	-2.6	-2.5	-2.5	-2.4	-2.5	-2.5	-2.6	-2.7
Efficiency(%)	51.8	52.1	53.1	54.3	54.9	55.5	55.7	56.3	55.4	56.4	56.5	57.1	56.8	56.6	54.4	53.1
Peak Gain(dBi)	1.2	1.2	1.3	1.3	1.3	1.4	1.6	1.5	1.5	1.5	1.4	1.5	1.4	1.4	1.2	1.1

7-3. 3D Efficiency vs. Frequency



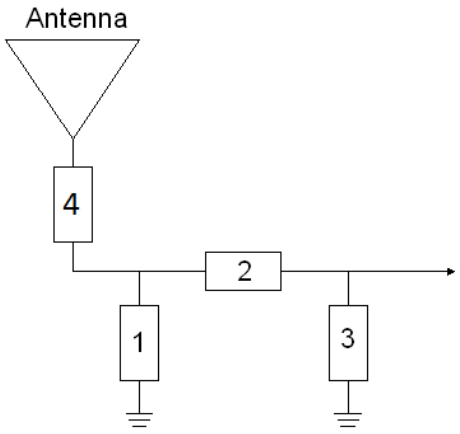
8. Frequency tuning and Matching circuit

8-1. Chip antenna tuning scenario：



8-2. Matching circuit：

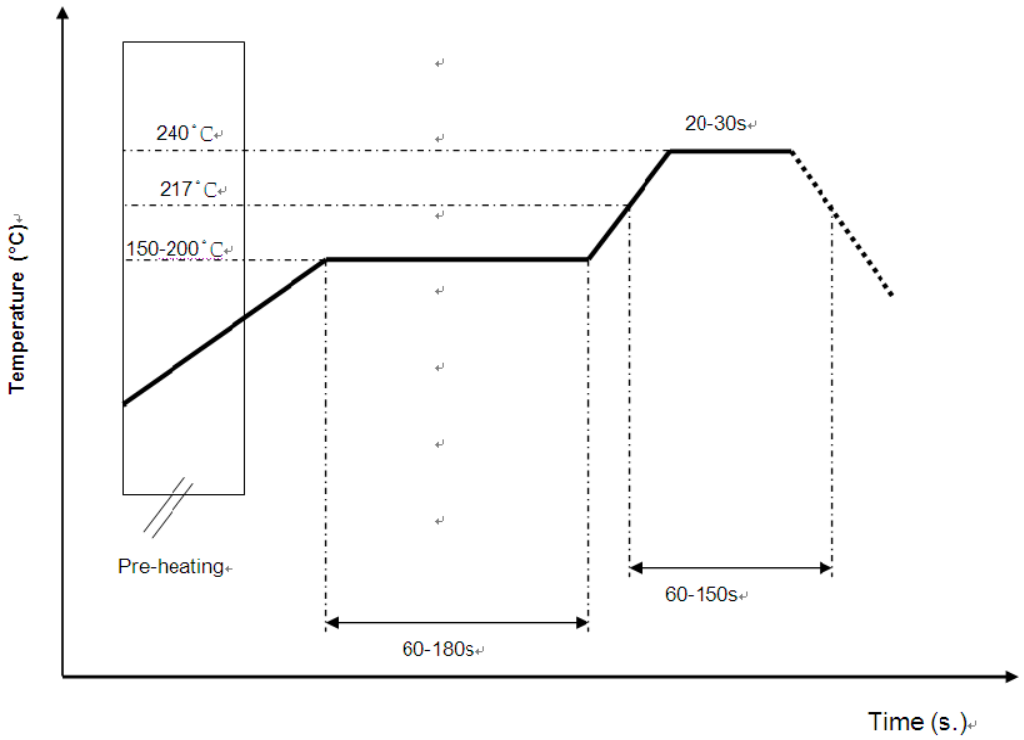
With the following recommended values of matching and tuning components, the center frequencies will be about 2442 MHz at our standard 40 x 40 mm^2 evaluation board. However, these are typical reference values that may need to be changed when circuit boards or part vendors are different.



System Matching Circuit Component			
Location	Description	Vendor	Tolerance
1	N/A	-	-
2	1.6nH, (0402)	MURATA	±0.1nH
3	0.7pF, (0402)	MURATA	±0.05pF
4 Fine-tuning element	8.2nH, (0402)	MURATA	±2%

9. Soldering Conditions

Typical Soldering Profile for Lead-free Process



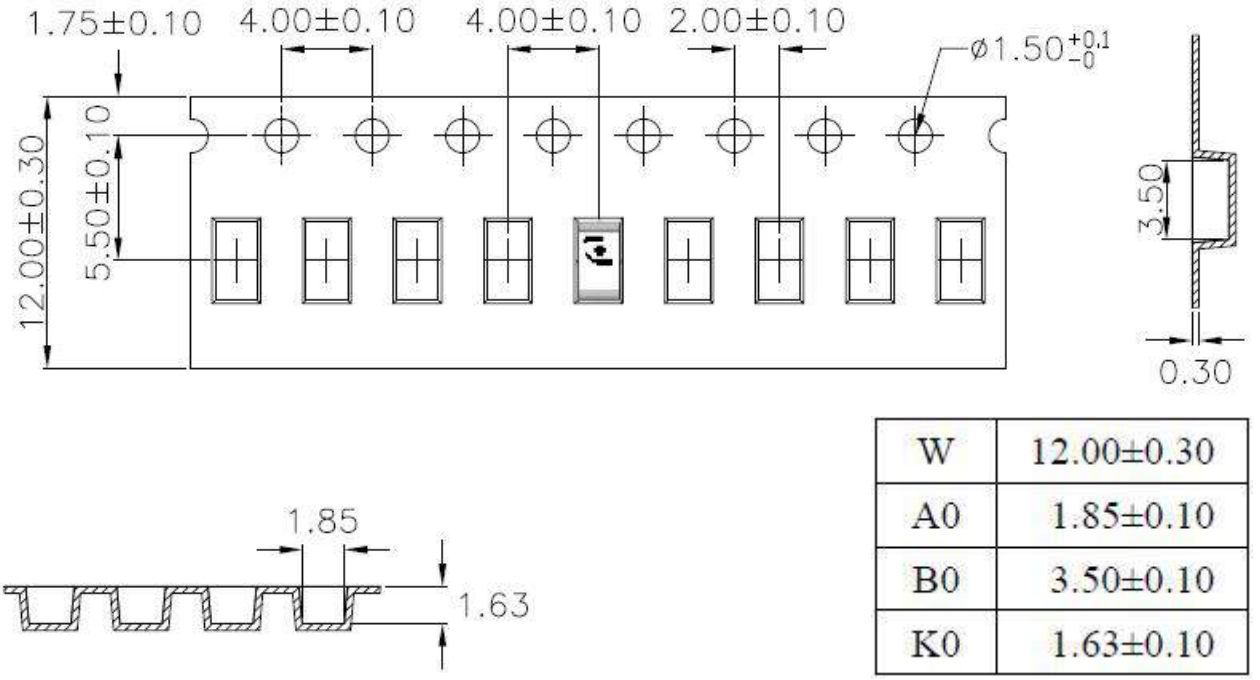
*Recommended solder paste alloy: SAC305 (Sn96.5 /Ag3 /Cu0.5) Lead Free solder paste

10. Packing

(1) Quantity/Reel: 2000pcs/Reel

(2) Plastic tape: Black Conductive Polystyrene.

a. Tape Drawing & Tape Dimensions (unit: mm)



W	12.00±0.30
A0	1.85±0.10
B0	3.50±0.10
K0	1.63±0.10

11. Operating & Storage Conditions

11-1. Operating

(1) Maximum Input Power: 2 W

(2) Operating Temperature: -40℃ to 85℃

(3) Relative Humidity: 10% to 70%

11-2. Storage (sealed)

(1) Storage Temperature: -5℃ to 40℃

(2) Relative Humidity: 20% to 70%

(3) Shelf Life: 1 year

11-3. Storage (unsealed)

Meet the criteria of J-STD-033 MSL2a

11-4. Storage (After mounted on customer's PCB with SMT process)

(1) Storage Temperature**:** -40℃ to 85℃

(2) Relative Humidity**:** 10% to 70%

12. Notice

(1) Installation Guide:

Please refer to Unictron's application note "General guidelines for the installation of Unictron's chip antennas" for further information.

(2) All specifications are subject to change without notice.

Composition Sheet(EU-RoHS Certificate)

The following products are certified to be in compliance with the RoHS (DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 08 June 2011) containing COMMISSION DELEGATED DIRECTIVE (EU) 2015/863.

Part No. 零件料號	Weight (mg) 總重(毫克)	Component Part 組成部件	Material Name 組成材料	Weight of material in Component (mg) 組成材料重量(毫克)	Substance Name 物質名稱	CAS No.	Weight % of substance in Material 材料中的物質比例
H2U38D1E1B0100	0.0024	Ceramic powder	Ceramics	0.021	Aluminum	1344-28-1	45
					Glass (*1)	68997-18-4	55
		Silver paste	Paste	0.0006	Silver	7440-22-4	92
					Ethyl cellulose	9004-57-3	2
					Diethylene Glycol Monobutyl Ether	112-34-5	6
		Silver paste	Paste	0.0006	Silver	7440-22-4	80
					Cellulose Resin	Confidential	2
					2,2,4trimethyl-1,3-pentanediol-1-monoisobutyrate/2,2,4trimethyl-1,3-pentanediol-di-isobutyrate	25265-77-4/6846-50-0	7
					3,3,5-Trimethy-1-hexanol	3452-97-9	2
					p-Menthan-8-ol/p-Menthan-1-ol	498-81-7/21129-27-1	9
		Silver paste	Paste	0.0005	Silver	7440-22-4	66
					Class frit	Confidential	10
					Resins	Confidential	5
					Rosin	8050-09-7	1
					Additives	Confidential	1
					Diethylene glycol monobutyl ether	112-34-5	10
					Diethylene glycol monobutyl ether acetic	124-17-4	5
					Terpineol	8000-41-7	1
					Benzyl alcohol	100-51-6	1
		Marking (ink-black)	Ink	0.0002	Lead free glass/alumina mixed powder	-	60
					Co-Ni-Mn-Cr-Fe spinel powder	-	12
					Ethylene glycol monobutyl ether	111-76-2	20
					Ethyl Cellulose	9004-57-3	8
		Metal Plating Layer	Ni plating	0.0003	Nickel sulfamate	13770-89-3	60
					Water	7732-18-5	40
		Metal Plating Layer	Tin plating	0.0003	Stannous methanesulfonic acid	53408-94-9	60
					Methanesulfonic acid	75-75-2	10
					Water	7732-18-5	30

* EU-RoHS(C/NG) --> C ; RoHS Compliant, NG ; RoHS Not Compliant

Signature :
Name : Celia Chen
Title : QA
Company : Unictron Technologies Corp.
Date : 2021.12.15

Safety Data Sheet

TCP-L7SH (Glass Powder)

Date Issued: 2010/02/05
Last update: 2018/03/12

1. PRODCUCT AND COMPANY IDENTIFICATION

a) Product Name: TCP-L7SH

b) other names: Glass Powder

c) Recommended use of the chemical and restrictions on use:

Recommended use: Chip, Module and Antenna for RF

Restrictions of use: n/a

d) Manufacturer/Supplier/Distributor Information

Name: TEMEN TECH

Address: 106-10, Gwahakdanji-ro, Gangneung-si, Gangwon-do, KOREA 210-340

Phone number: +82-33-641-5492

e) Emergency contact phone numbers/fax numbers:

+82-33-641-5492 / +82-33-646-5493

2. HAZARDS IDENTIFICATION

a) Hazard·Risk Classification: Serious eye damage/ eye irritation : Category2

Specific Target Organ Toxicity (single exposure) : Category3 (respiratory tract irritation)

Specific Target Organ Toxicity (repeated exposure) : Category1

b) Label elements including precautionary statements

Symbol:

Signal Word: Danger

Hazard·Risk Statement: H319 Causes serious eye irritation

H335 May cause respiratory

H372 Causes damage to organs through prolonged or repeated exposure

Precautionary Statement:

Precaution: P261 Avoid breathing dust/fume/gas/mist/vapors/spray

P264 Wash skin thoroughly after handling

P270 Do not eat, drink or smoke when using this product

P271 Use only outdoors or in a well-ventilated area

P280 Wear protective gloves/protective clothing/eye protection/face protection

Measure: P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P337+P313 If eye irritation persists: Get medical advice/attention

P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Storage: P403+P233 Store in a well-ventilated place. Keep container tightly closed

Disposal: P501 Dispose of contents/container to (According to related regulations set forth in)

c) Other Hazard·Risk which are not included in the classification criteria (e.g. dust explosion hazard):

Health: 1

Flammability: 0

Reactivity: 0

3. Composition/Information on ingredients

Chemical Name	Common name	CAS No.	Content (%)
Aluminum Oxide	Alumina	1344-28-1	40~50 %
Frit	Glass (*1)	65997-18-4	50~60 %

(*1:See attached appendix 1)

Frit, with CAS No. [65997-18-4], is a mixture of inorganic chemical substances produced by rapidly quenching a molten, complex combination of materials, confining the chemical substances thus manufactured as non-migratory components of glassy solid flakes or granules. These components are present as part of the Frit.

4. First aid measures

a) Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. if present and easy to do. Continue rinsing

If eye irritation persists: Get medical advice/attention

b) Skin contact: Remove contaminated clothing and shoes

b) Skin contact: Wash skin thoroughly with soap and water

Call a POISON CENTER or doctor/physician if you feel unwell

c) Inhalation: Remove victim to fresh air

IF INHALED: Call a POISON CENTER or doctor/physician if you feel unwell

d) Ingestion Immediately call a POISON CENTER or doctor/physician

e) Indication of immediate medical attention and notes for physician:

Do let doctor/physician know about this material and be taken care of by them

5. Fire-Fighting measures

a) Suitable extinguishing media: Any of the extinguishing agents, including water, carbon dioxide gas, foam, dry chemicals and powder are effective. Select an extinguishing agent depending on circumstances (source of fire, etc.)

b) Specific hazards arising from the chemical (e.g. nature of any hazardous combustion products):

Glass powder itself is not combustible.

c) Special protective equipment and precautions for fire-fighters:

Wear a self-contained breathing apparatus

6. Accidental release measures

a) Personal precautions, protective equipment and emergency procedures:

If necessary, wear a safety mask, safety gloves or safety goggles

b) Environmental precautions and protective procedures:

Prevent flow out to river, etc. so as not to badly affect.

c) Methods and materials for containment and cleaning up:

If spilled on the floor, clean quietly so that dust particles will not be dispersed and put into a container or bag. For disposal, treat it same as general industrial waste

7. Handling and storage

a) Precautions for safe handling: Avoid inhalation or contact with the eye or skin. If necessary, use gloves, safety glasses(preferably goggles) and dust mask (approved by the government authorities: replaceable/one-way)

b) Conditions for safe storage (including any incompatibilities):

Store in a cool, dry place away from incompatible materials

8. Exposure controls & personal protection

a) Control parameters (e.g. occupational exposure limit values, biological limit values):

ACGIH(2008)	TLV-TWA : Aluminum metal and insoluble compounds - 1mg/m^3 (Respirable particulate mass)
OSHA(2006)	PEL-TWA : alpha-Alumina - 15mg/m^3 (Total dust), 5mg/m3 (inhalable dust)

b) Appropriate engineering controls:

Install localized shower units in workplaces where dusts are generated by powder products

c) Personal protective equipment

Respiratory protection:	Dust mask (approved by the government authorities: replaceable / one-way)
Eye protection:	Safety glasses
Hands protection:	Gloves
Body protection:	Wear protective clothing

9. Physical and chemical properties

a) Appearance (physical state, color etc):

Physical state	Powder
color	White
b) Odor:	n/a
c) Odor threshold:	n/a
d) pH:	n/a
e) Meting point/freezing point:	(Softening point) approx. 750℃

f) Initial boiling point and boiling range:

> 1000 ℃ (at 760mmHg)

g) Flash point:	n/a
h) Evaporation:	n/a
i) Flammability (solid, gas):	n/a

j) Upper/lower flammability or explosive limits:

- / -

k) Vapor pressure:	n/a
l) Solubility:	0.25 ㎎/ℓ (at 25℃)
m) Vapor density:	n/a
n) Relative density:	1.2 g/cm^3

o) Partition coefficient (n-octanol/water):

n/a

p) Auto-ignition temperature:	n/a
q) Decomposition temperature:	n/a
r) Viscosity:	n/a
s) Molecular mass:	n/a

10. Stability and reactivity

a) Chemical stability and possibility of hazardous reactions:

Stable at normal condition

b) Conditions to avoid (e.g. static discharge, shock or vibration, etc):

n/a

c) Incompatible materials: Strong oxidizing reagent

d) Hazardous decomposition products:

n/a

11. Toxicological information

a) Information on the likely routes of exposure:

Eye and Skin contact

b) Health hazards information

Acute toxic:

Oral	LD_{50} > 5000 ㎎/㎏ Rat
Skin	n/a
Inhalation	n/a

Skin corrosive/irritant: n/a

Serious eye damage/eye irritation:

n/a

Respiratory sensitization: n/a

Skin sensitization: n/a

Carcinogenicity:

IARC	n/a
OSHA	n/a
ACGIH	A4 (Aluminum insoluble compounds)
NTP	n/a
EU CLP	n/a

Germ Cell Mutagenicity: In vivo germ cell multi-generation mutagenicity test : Negative

Reproductive toxicity: n/a

Specific target organ toxicity (single exposure):

Category3 (respiratory tract irritation)

Specific target organ toxicity (repeated exposure):

Cause damage to organs(lung) through prolonged or repeated exposure

Aspiration hazard: n/a

12. Ecological information

a) Aquatic and terrestrial ecotoxicity:

Fish	n/a
Shellfish	n/a
Birds	n/a

b) Persistence and degradability:

Remain	n/a
Dissolve	n/a

c) Bioaccumulative potential:

Ingredients Name	Biological half-life (day)	Rate of absorption	
		oral	respiratory tract
Al	550	0.1	0.3

d) Mobility in soil: n/a

e) Other adverse effects: n/a

13. Disposal considerations

a) Disposal method: User of the product should contract with the local government or licensed 'Industrial Waste Haulers' for disposal of waste

14. Transport information

a) UN number: None

b) UN proper shipping name: n/a

c) Transport hazard class: n/a

d) Packing group (if applicable): n/a

e) Marine pollution (yes/no): n/a

f) Special precaution which a user to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises: n/a

15. Regulatory information

TSCA inventory : listed (alpha-Alumina)

Please refer to any other local / national measures that may be relevant

16. Other information

a) Information source and references:

OSHA - Occupational Safety and Health Administration

N/A - Not Applicable

PEL - Permissible Exposure Limit

TSCA - Toxic Substances Control Act

TLV - Threshold Limit Value (registered terminology of ACGIH)

TWA - Time Weighted Average

ACGIH (2001) : American Conference of Industrial Hygienists

National Institute of Technology and Evaluation GHS Data base

b) Issuing date: 2010/02/05

c) Revision number and date:

Revised time 5

Last update 2018/03/12

d) Organizationthat prepared the SDS :

Name: R&D Institute

Address/telephone number : 106-10, Gwahakdanji-ro, Gangneung-si, Gangwon-do, KOREA 210-340, +82-33-641-5492

e) Person who prepared the SDS:

Title: Director of Research Institute

Name (signature): Mr. Lim Wook

f) Others:

This information will be revised based on SDS is served by Korea occupational Safety & Health Agency. Out of the included content, the information relating to the included amounts and physical and chemical properties are not certified values.

Appendix 1

Frit Composition

Chemical Name	Common name	CAS No.	Content (%)
Silicon Dioxide	Quartz	14808-60-7	60~70 %
Aluminum Oxide	Alumina	1344-28-1	5~15 %
Boron Oxide		1303-86-2	5~15 %
Calcium Carbonate		471-34-1	5~15 %
Zirconium Oxide		1314-23-4	5~15 %

Note :

This glass powder is mixed aluminum oxide and borosilicate glass which chemical composition is generally described in the above table. where the each component is expressed in oxide according to the rule in the glass industry. However, glass is indeed obtained by mineralogical process, resulting in a chemical network (matrix). Its constituents are closely linked together and are in a specific chemical environment, totally different from the initial state (in a raw materials) and from that occurring in simple compounds as metals or oxides. In any usual conditions, glass never gives metal or oxide as direct dissociation products. Glass is characterized by a continuous and essentially amorphous inorganic macromolecular structure, which is highly insoluble and biologically and chemically inert.

安全資料表

一、化學品與廠商資料

化學品名稱：IP3802UO-41-5	
其他名稱:	
建議用途及限制使用：導電銀漿,禁止使用於食品加工。	
製造者或供應者名稱：勤凱科技股份有限公司	
製造者或供應者地址：高雄市 831 大寮區大有三街 32 號	
緊急聯絡電話：(07)787-3287	傳真電話：(07)787-3290

二、危害辨識資料

化學品危害分類: 水環境之危害物質(急毒性)第 3 級 易燃易體第 4 級 急毒性物質第 5 級(皮膚) 嚴重損傷/刺激眼睛物質第 2A 級 特定標的器官系統毒性物質(單一暴露)第 3 級
標示內容：  警示語：警告。 危害警告訊息： 對水生生物有害 可燃液體 皮膚接觸可能有害 造成眼睛刺激 可能造成呼吸道刺激 危害防範措施：緊蓋容器、置容器於通風良好的地方、遠離高溫、若與眼睛接觸，立刻以大量的水洗滌後洽詢醫療。
其他危害：-

三、成分辨識資料

混合物：

化學性質：易揮發物質(含)，可燃性物質。		
危害成分之中英文名稱：	化學文摘登錄號碼	濃度範圍(成分百分比)：
銀(Silver)	7440-22-4	91.5 ± 2(%)
乙基纖維素(Ethyl cellulose)	9004-57-3	1-5(%)
二乙二醇單丁醚(Diethylene Glycol Monobutyl Ether)	112-34-5	3-15(%)

四、急救措施

不同暴露途徑之急救方法：

吸　　入：1. 移走污染源或將患者移到空氣新鮮處。 2. 若呼吸停止立即由受訓過的人施以人工呼吸；若心跳停止施行心肺復甦術。 3. 如呼吸困難，給予氧氣。 4. 立即就醫。 皮膚接觸：接觸液體時，以大量室溫清水沖洗患處 15 分鐘，使用無菌乾布處哩，立即送醫。 眼睛接觸：1. 如果發生刺激感，移走污染源或將患者移到空氣新鮮處。 2. 若刺激感持續，立即就醫。 食　　入：先行催吐後，送醫救助。。
最重要症狀及危害效應：呼吸道不適，皮膚長疹，昏眩。
對急救人員之防護：應穿著 C 級防護裝備在安全區實施急救。
對醫師之提示：患者吸入時，考慮給予氧氣，不可用熱水清洗凍傷部位。

五、滅火措施

適用滅火劑：乾粉、二氧化碳、泡沫滅火器。
滅火時可能遭遇之特殊危害：刺激性味道（有機溶劑揮發，燃燒時產生 CO，CO2）。
特殊滅火程序： 1. 人員處於上風處。 2. 戴上呼吸用具及防護設備。 3. 以泡沫或乾粉滅火器滅火。
消防人員之特殊防護設備：穿戴抗有機溶劑之口罩及不滲透手套。

六、洩漏處理方法

個人應注意事項： 避免接處皮膚，吸入或碰到眼睛，裝置容器需密封。
環境注意事項： 移除火源、熱源，避免產生火花，防止洩漏物進入下水道。
清理方法：未受污染可回收再使用；受污染則需由專業回收廠回收貴金屬。

七、安全處置與儲存方法

處置： 處置要求：1. 在通風良好處處置。2. 避免物質蓄積在窪地及汙水坑。3. 不要進入局限空間。4. 避免吸菸、暴露於裸光或引火源。5. 避免接觸不相容物質。6. 操作時禁止飲食或吸菸。7. 容器不使用時須緊閉。8. 避免容器物理性損壞。 注意事項：1. 該物質會累積過氧化物，若揮發或蒸餾或濃縮處理可能會產生危害。例如在容器開口周圍可能累積形成高濃度。2.採購此類會過氧化的物質，須確保在其過氧化前可以用完。3.需有人控管並註明此物質具有過氧化的特性，應確定有效期限，期限前須加以處理除去過氧化或廢棄。4. 應將收貨日期載明在瓶身，開啟容器時亦應每次加註開啟日期。5. 避免所有個人接觸，包括吸入。6. 若有過度暴露風險時，應穿戴個人防護衣。7. 處置後務必用手及肥皂洗手。8. 工作服應分開清洗。9. 維持良好的職業工作習慣。10. 定期偵測空氣品質，確保維持工作環境之安全。
儲存： 儲存要求：1. 儲存於原容器中。2. 保持容器緊閉。3. 禁止吸菸、暴露於裸光、熱源或引火源。4. 儲存於陰涼、乾燥及通風良好的地方。5. 遠離不相容物質及糧食容器。6. 避免容器物理性損壞並定期測漏。7. 避免接觸強酸或強鹼，若溫度提高可能有潛在失控風險。8. 避免接觸鋁，可能因而釋放出氫氣。9. 避免與氧化劑反應。

八、暴露預防措施

工程控制： 1. 提供局部排氣的通風系統。2. 若物質濃度超過爆炸下限時，通風設備必須為防爆型。
控制參數：

八小時日時量平均容許濃度 TWA	短時間時量平均容許濃度 STEL	最高容許濃度 CEILING	生物指標 BEIs
-	-	-	-

個人防護設備： 1. 呼吸防護/Respiration：1. 若是經常性的使用或會暴露在高濃度下，需要呼吸防護。2. 呼吸防護依最小至最大的暴露濃度而有所不同。3. 在使用前，需確認警告注意事項。4. 使用任何含有機蒸氣濾罐之化學濾罐式呼吸防護具。或是任何全面型含有機蒸氣濾罐之化學濾罐式呼吸防護具。或是任何全面型含有機濾毒罐之空氣清淨式呼吸防護具。5. 未知濃度或立即危害生命健康的濃度狀況下：使用任何壓力需求式或其他正壓全面型供氣式呼吸防護具輔以逃生型設備。或是任何全面型自攜式呼吸防護具。 2. 手部防護/Hand：1. 化學防護手套。 3. 眼睛防護/Eye：1. 防濺安全護目鏡。2. 提供緊急眼睛清洗裝置或是快速淋浴裝置等。 4. 皮膚及身體防護/Skin & Body：1. 化學防護衣。
衛生措施： 1. 工作後盡速脫掉汙染之衣物，洗淨後才可再穿戴或丟棄，且須告知洗衣人員汙染之危害性。2. 工作場所嚴禁抽菸或飲食。3. 處理此物後，需徹底洗手。4. 維持作業場所清潔。

九、物理及化學性質

外觀：偏白色膏狀。	氣味：芬芳味
嗅覺閾值：—	熔點：-
pH 值：—	沸點/沸點範圍：220-230℃
易燃性（固體，氣體）：可燃性液體	閃火點：392℉
分解溫度：—	測試方法：開杯
自燃溫度：285 ℃。	爆炸界限：LEL 0.8% ; UEL 7.0%。
蒸氣壓：10 mm Hg at 100 F。	蒸氣密度：>4(空氣=1)
密度：3-4 gm/cm3。	溶解度：不溶於水
辛醇/水分配係數（log Kow）：—	揮發速度：—

十、安定性及反應性

安定性：穩定的。。
特殊狀況下可能之危害反應：可燃性。
應避免之狀況：應避免接近火源、熱源。
應避免之物質：強氧化物、酸、鹼。
危害分解物：一氧化碳，二氧化碳，二氧化氮。。

十一、毒性資料

急毒性： 揮發物吸入過量會立即引起頭暈、昏眩、呼吸道不適。 LD50(測試動物、吸收途徑) ：2260 mg/kg (v, rabbit), 2340mg/kg (oral, guinea pig), 6500mg/kg (oral, mouse & rat);14,500 mg/kg (skin, rabbit)。 LC50(測試動物、吸收途徑) ：2,500mg/m3 (inhalation, rat)。

慢毒性或長期毒性： —
特殊效應：—

十二、生態資料

生態毒性： LC50（魚類）：— EC50（水生無脊椎動物）：— 生物濃縮係數（BCF）：—
持久性及降解性：— 半衰期（空氣）：— 半衰期（水表面）：— 半衰期（地下水）：— 半衰期（土壤）：—
生物蓄積性：—
土壤中之流動性：—
其他不良之流動效應：—

十三、廢棄處置方法

廢棄處置方法： 允收集後送交專業回收廠商回收貴金屬。

十四、運送資料

聯合國編號：—
聯合國運輸名稱：—
運輸危害分類：—
包裝類別：—
海洋污染物（是/否）：否
特殊運送方法及注意事項：避免於高溫下運送。

十五、法規資料

適用法規： 1. 職業安全衛生法。 2. 危害性化學品標示及通識規則。 3. 公共危險品及可燃性高壓氣體設置標準暨安全管理辦法。 4. 事業廢棄物貯存清除處理方法及設施標準。 5. 危害性化學品評估及分級管理辦法。

十六、其他資料

參考文獻	—	
製表單位	名稱：勤凱科技股份有限公司	電話：+88677873287
	地址：高雄市大寮區大有三街 32 號	傳真：+88677873290
製 表 人	職稱：總經理室專案中心課長	姓名： 張琨專
修訂日期	2021 年 7 月 12 日	版本：A
備 註	上述資料中符號〝—〞代表目前無相關資料，而符號〝/〞代表此欄位對該物質並不適用。	

Issue date: Jun. 15, 2012
Issue update: Jun. 16, 2018

Safety Data Sheet

1. Identification

Product identifier:

Other names	K3352F
Other names or synonyms:	Silver Paste
GHS product number:	11088E(01)

Manufacture

Company name:	Daiken Chemical Sales & Mfg Co., Ltd
Address:	2-7-19 Hanaten nishi, Joto-ku, Osaka, Japan
Charge post:	Manufacturing Technique.
Phone number:	81-6-6961-6533
Fax number:	81-6-6968-2511

Emergency phone number: 81-6-6961-6533

2. Hazards identification

【GHS classification of the substance/mixture and any national or regional information】

Physical and chemical hazards

Explosives	Not applicable
flammable gases	Not applicable
Flammable aerosols	Not applicable
Oxidizing gases	Not applicable
Gases under pressure	Not applicable
Flammable liquids	Not applicable
Flammable solids	Out of category
Self-reactive substances and mixtures	Not applicable
Pyrophoric liquids	Off category
Pyrophoric solids	Not applicable
Self-heating substances and mixtures	Not applicable
Water-reactive combustible substance	Not applicable
Oxidizing liquids	Not applicable
Oxidizing solids	Unable to classify
Organic peroxides	Not applicable
Metal corrosives	Unable to classify

Health hazards

Acute toxicity (Oral)	Out of category

Acute toxicity (Dermal)	Out of category
Acute toxicity (Inhalation: Gases)	Not applicable
Acute toxicity (Inhalation: Vapors)	Unable to classify
Acute toxicity (Inhalation: Dusts and Mists)	Unable to classify
Skin corrosion/irritation	Category 3
Serious eye damage/eye irritation	Category 2A
Respiratory sensitization	Unable to classify
Skin sensitization	Category 1
Germ cell mutagenicity	Unable to classify
Carcinogenicity	Unable to classify
Reproductive toxicity	Unable to classify
Specific target organ/systemic toxicity (single exposure)	Category 1(Respiratory organ)
Specific target organ/systemic toxicity (repeated exposure)	Category1(Eye,Inhalation:Respiratory organ)
Aspiration hazards	Unable to classify

Environmental hazards

Hazardous to the aquatic environment (Acute)	Category 3
Hazardous to the aquatic environment (Chronic)	Category 3
Hazardous to the ozone layer	Unable to classify

【GHS label elements, including precautionary statements】

Pictogram or symbol

Signal Word:

Danger

Hazard statement(s)

Causes skin irritation

Causes serious eye irritation

May cause an allergic skin reaction

Causes damage to respiratory organ

Causes damage to eye and respiratory organ through prolonged or repeated exposure

Harmful to aquatic life

Harmful to aquatic life with long-lasting effects

Precautionary statement(s)

【Prevention】

Wear protective gloves.

Do not breathe dust, smoke, gas, mist, vapor or spray.

Contaminated work clothing should not be allowed out of the workplace.

Do not eat, drink or smoke when using this product.

Wash hands thoroughly after handling.

【Response】

IF IN EYES:

Immediately rinse eyes cautiously with water for more than 15 minutes.

Remove contact lenses if present so that you can rinse easier.

Then, soonest get medical advice/attention..

IF ON SKIN:

Immediately wash with plenty of soap and water.

If skin irritation or rush occurs, seek medical advice/attention.

Wash hands every time after handling.

【Storage】

Store it in a closed packing.

Store it refraining from direct sunshine.

Store it in airy place or well-ventilated place (5 ~ 15 °C).

Store it keeping away from heat and fire.

【Disposal】

Consign disposal of the waste, leftover and empty packing of it to the qualified waste dealer.

Don't drain the water used for cleaning machine directly to the ground or a public ditch.

Don't dispose the packing after use as it is to a public dumping ground.

Dispose the waste and the drain in accordance with local/regional/international regulation.

3. Composition/information on ingredients

Substance/mixture Mixture

Chemical identity (Chemical formula): Not applicable

Common name, synonyms etc.: Silver Paste

CAS number and other unique identifiers:

Ingredient name	Contents (wt %)	CAS No.
Silver	75.0~85.0	7440-22-4
Cellulose Resin	1.5~3.5	Confidential
2,2,4trimethyl-1,3-pentanediol-1-monoiso-butyrate / 2,2,4trimethyl-1,3-pentanediol-di-isobutyrate	5.0~9.0	25265-77-4 /6846-50-0
3,3,5-Trimethy-1-hexanol	1.0~3.0	3452-97-9
p-Menthan-8-ol / p-Menthan-1-ol	7.0~11.0	498-81-7/ 21129-27-1

4. First-aid measures

Description of necessary measures, subdivided according to the different routes of exposure, i.e. inhalation, skin and eye contact and ingestion

Inhalation:	Move the sufferer to a place of fresh air immediately. Keep him or her in a rest and warm. Take a medical advice. If the sufferer's breathing is stopped or weak, artificial respiration should be provided, loosening clothes and securing a respiratory tract. If the sufferer is breathing and vomiting lay down with head on his or her side.
Skin contact:	Wash the stained area with soap and a deal of water. If skin irritation or blister occurs, seek medical advice.
Eye contact	Wash eyes with running water immediately for 15 min. or more, and then take a medical advice.
Ingestion	Rinse a mouth with plenty of water, and then take a medical advice immediately.

5. Fire-fighting measures

Suitable (and unsuitable) extinguishing media:

Carbon Dioxide, Fire Foam, Fire Powder, Fire dry sand, (Do not use water.)

Specific hazards arising from the chemical:

It may discharge toxic gases such as CO, NOx etc.

Special protective equipment and precautions for fire fighters:

Wear suitable breathing apparatus and chemical protective clothing.

Do not use water as the extinguisher and use the specified media above.

Keep combustible materials away from the area.

Fire-fighting should be performed from the windward.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Wear protective tools such as protective masks, safety goggles, gloves, apron while working.

Environmental precautions:

Be careful not to cause the influence on environment by discharging directly to a river etc.

Methods and materials for containment and cleaning up

Methods for cleaning up:

If leakage happens, move away ignition source, heating medium for high temperature, flammable and materials nearby. (A suitable extinguisher should be prepared for fire emergency.)

If leakage happens, collect it by absorbing with dry sand, soil and other inflammable material and put in a container which can be sealed and store it in a safe place until disposing.

.Handle or dispose the waste and the dirty materials with it in accordance with the local law.

Preventive measures of secondary disaster:

To collect the leakage, use tools which do not break out sparks and electric discharge.

Be careful not to cause the influence on environment by discharging to a river etc.

7. Handling and storage

Precautions for safe handling

Technical measure:

Use explosion protected type apparatus.

Equip exhaust system to circulate air.

Lay out the working place not to put a source of ignition and heat nearby.

Handle it in the well-ventilated place.

Seal the container or packing every time after use.

Do not use any material emitting flame, sparks and heat in a surrounding area.

Fix the equipment and use explosion protected type electric apparatus for measure of static electricity.

Use spark preventing type tools.

Put on protectors such as mask, glove so on to protect skin and mucous membrane.

Safe handling:

Equip a local exhaust system when handling in a closed place..

Avoid contact with eyes, skin and clothes, and fully wash hands after handling.

Conditions for safe storage, including any incompatibilities

Seal the container while it is stored.

Keep in a dry cool place, avoiding direct sun shine and store in a cool place (5 ~ 15 °C).

Do not store it in a room smaller than 2 m^3 because it is flammable.

Use safe materials for packaging.

Use a safe container such as rigid plastic container, which can be sealed.

8. Exposure controls/personal protection

Control parameters e.g. occupational limit values or biological limit values

Control concentration:

Not limited

Occupational exposure limits:

Silver 0.1mg/m^3 (TWA) (13599 of Chemical Products, Kagakukougyou nipposya)

Appropriate engineering controls

Equipment measures:

Use closed system equipment and a partial exhaust system. (Guidelines on OSHMS)

Use explosion proof type equipments.

Individual protection measures, such as personal protective equipment (PPE)

Protective equipments

Respiratory organs:	Wear anti-organic poison gas mask.

	Wear air-supplied respirator in seal-up rooms.
Hands:	Wear gloves protecting from organic solvents and chemicals.
Eyes:	Wear chemical safety goggles.
Skin and body:	Wear clothes protecting from organic solvents and chemicals. Use protecting cream if necessary.

Hygienic measures:

Wash hands thoroughly after handling.

9. Physical and chemical properties

Physical state

Appearance (Physical state, Color etc.)	Solid (Paste), Grey
Odor:	Solvent smell
Melting point/freezing point:	Data are not available.
Boiling range:	Data are not available
Flash point	95°C
Fire point	Data are not available.
Freezing point	Data are not available.
Solubility(ies):	Date are not available.

10. Stability and reactivity

Chemical stability:

It is stable at normal (room) temperature and normal pressure.

Possibility of hazardous reactions:

It is stable at normal use. (Explosive)

Incompatible materials:

Strong acids, concentrated hydrogen peroxide solutions, ammonias (dry), rare nitric acid and concentrated sulfuric acid

Hazardous decomposition products:

It may emit CO, NOx hazardous gases when it burns.

11. Toxicological information

Acute toxicity

Ingredient Name	Toxicity	Reference
Silver	Oral rat LD50 >5000mg/kg	HSDB(2003)
	Skin rat:LD50 >2000mg/kg	HSDB(2003)
2,2,4trimethyl-1,3-pentanediol-di-isobuthylate	Oral rat LD50 3000mg/kg	
3,3,5-Trimethy-1-hexanol	Oral rat: LD50 1,160mg/kg	PATTY(4th, 1999)
	Skin rabbit:LD50-2990mg/kg	PATTY(4th, 1999)
p-Menthan-8-ol / p-Menthan-1-ol	Oral rat LD50 3200mg/kg	

Acute toxicity (oral) is out of category as mixture.

Acute toxicity (skin) is out of category as mixture.

Skin corrosion/irritation;

3,3,5-Trimethy-1-hexanol is classified to the category 2 (Moderate Irritation (SIDS (2003))).

The mixture is classified as the category 3

Serious eye damage/irritation

The main ingredient of this product is Silver. Silver is classified to the category 2B.

3,3,5-Trimethy-1-hexanol is classified to the category 2A (Moderate Irritation (SIDS (2003))).

This product as mixture is the category 2A.

Respiratory or skin sensitization;

The main ingredient, Silver is classified to the category 1 under skin sensitization.

This product as mixture is classified to the category 1 under Skin sensitization. (It may cause allergic dermatitis.)

Germ cell mutagenicity

This product as mixture is unable to be classified to the class, Germ cell mutagenicity due to insufficient data.

Carcinogenicity;

This product as mixture is unable to be classified to the class, Carcinogenicity due to insufficient data.

Reproductive toxicity;

3,3,5-Trimethy-1-hexanol is classified to the category 2 (SIDS (2003)).

This product as mixture is unable to be classified to the class.

STOST-single exposure;

The main ingredient, Silver is classified to category 1 under the class, STOST-single Exposure.

This product as mixture is unable to be classified to the class, STOST-single exposure due to insufficient data.

STOST-repeated exposure;

The main ingredient, Silver is classified to the category 1 under the class, STOST-repeated Exposure. Silver also indicates chronic toxicity and causes silver poisoning with 1g/kg (human intravenous injection).

3,3,5-Trimethy-1-hexanol is classified to the category 2 under the class, STOST-repeated Exposure (liver, kidney).

The product as mixture is unable to be classified to the class, STOST-repeated exposure due to insufficient data.

Aspiration hazard;

This product as mixture can not be classified to any category due to insufficient data.

12. Ecological information

Hazardous to the aquatic environment – acute hazard;

2,2,4trimethyl-1,3-pentanediol-di-isobutyrate is classified to the category 2 (Algae (Selenastrum capricornutum) 72h EC50 = 8.0 mg/L(OECD SIDS:1995)).

3,3,5-Trimethy-1-hexanol is classified to the category 2 (Crustacea (Daphnia magna) 48h

EC50 = 6.77mg/L(SIDS:2003)).

This product as mixture is the category 3.

Hazardous to the aquatic environment - chronic hazard;

2,2,4trimethyl-1,3-pentanediol-di-isobutyrate is classified to the category 3 (Fish (Medaka) 96h EC50 = 18 mg/L(OECD SIDS:1995)).

3,3,5-Trimethy-1-hexanol is classified to the category 2 (hazardous to the aquatic environment – acute hazard is category 2 and not rapidly degradable).

This product as mixture is the category 3.

Hazardous to the ozone layer;

Not classifiable because of data shortage

13. Disposal considerations

Remainder waste:

Dispose waste in accordance with local/regional/national regulations.

Consign disposal of the wastes to a licensee industrial waste disposer.

Contaminated container and wrapping:

Clean and recycle contaminated containers or dispose appropriately according to the standard of the relevant statute and the local government.

14. Transport information

UN number:	Not applicable
UN Proper Shipping Name:	Not applicable
Transport hazard class(es):	Not applicable
Packing Group, if applicable:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user:	Transport in accordance with the local fire law. Transport with reference to the handling and storage information mentioned above. Be careful to avoid direct sunlight. Load the containers appropriately ensuring prevention from tumbling, dropping, damage and collapse of the cargoes.

15. Regulatory information

Japanese regulations

Fire Service Law: Designated flammable substance (Flammable liquid)

Regulation of PRTR:

Class I Designated Chemical Substances, Lead and Lead compound (230th)

Industrial Safety and Health Law

Hazardous substance which should notify a name, Lead and Inorganic lead compound

16. Other information including information on preparation and revisions of the SDS

Key literature references and sources for data

1)"14102 NO KAGAKU SHOUHIN (14102 Chemical Goods)" published by The Chemical Daily Co., Ltd.

2)"YOUZAI HAND BOOK" published by Kodansha Scientific.

3)"SEIHIN ANZEN Data Sheet no sakusei shishin; (making guide of Material Safety Data Sheet)", October, 2001 (published by Japan Chemical Industry Association)

4) PATTY (4th, 1999)

Although the contents of this sheet are described based on data and information which are available to us at the time of issue, they do not make any kind of guarantee. Moreover, since the warning and directions written herein are assumed for the usual handling, in case of carrying out special handling, please handle it after implementing the safety measures which are newly suitable for a use and usage.

End of SDS

日期：2019/03/14

安全資料表

1. 化學品與廠商資料

化學品名稱	: DP4303W
其他名稱	: 導電材料
建議用途及限制使用	: 僅限於電子工業用途
製造者	: NAMICS CORPORATION
擔當部門	: 品質保證本部
地址	: 〒950-3131　新潟市北區濁川3993番地
電話	: 81-25-258-5577
傳真	: 81-25-258-5511

2. 危害辨識資料

化學品危害分**類**

物理性危害

易燃液體	: 第4級

健康危害

急毒性物質(吞食)	: 第5級
急毒性物質(皮膚)	: 第5級
急毒性物質(吸入:蒸氣)	: 第4級
嚴重損傷/刺激眼睛物質	: 第2B級
皮膚過敏物質	: 第1級
特定標的器官系統毒性物質 - 單一暴露	: 第1級 (呼吸系統)
特定標的器官系統毒性物質 - 重複暴露	: 第1級 (眼, 呼吸器官)

對於上述記載之外的有害性，屬於分類物件外或不能分類。

標示內容

危害圖式

警示語

危險

危害警告訊息

H227 可燃液體
H303+H313 吸入或皮膚接觸可能有害
H317 可能導致皮膚過敏
H320 造成眼睛刺激
H332 吸入有害
H370 對器官 (呼吸系統) 造成傷害
H372 長期或重複暴露會對器官 (眼, 呼吸器官) 造成損害

危害防範措施

作業時請著用確切的保護器具，以免觸碰到皮膚或進入眼睛。
進入眼睛的話，立即用大量的清水清洗15分鐘以上。
完全清洗眼皮背面，盡可能迅速接受醫師的診斷。
如果附著在皮膚上的話，用大量的水和肥皂或皮膚用的清洗劑來充分洗淨。
如果外觀有發生變化，以及疼痛的話，接受醫師的診斷。
誤飲的場合，保持靜養並迅速接受醫師的診斷。
吸入蒸汽或氣體後，感到不舒服的話，在空氣清新的地方靜養，並接受醫師的診斷。
有須在陰暗場所保管要求的話，請務必遵守保管要求。
對於內容物或容器，請委託有受到當地部門許可的廢棄物處理公司來辦理。

3. 成分辨識資料

單一制品･混合物的區別 ：混合物
產品系列 ：導電材料

化學性質

危害成分名稱	CAS No.	成分百分比 %
銀	7440-22-4	60~70
玻璃	商業秘密	5~15
樹脂固體成分	商業秘密	1~10
松香	8050-09-7	<5
添加劑	商業秘密	<5
二甘醇一丁醚	112-34-5	5~15
乙酸二甘醇單丁基醚	124-17-4	1~10
松油醇	8000-41-7	<5
苯甲醇	100-51-6	<5

依照職業安全衛生法規定需記載的成分均已公開。

4. 急救措施

不同暴露途徑之急救方法

吸入

吸入蒸汽或氣體後，感到不舒服的話，在空氣清新的地方靜養，並迅速接受醫師的診斷。

皮膚接觸

迅速用布擦去附著物。
用大量的水和肥皂或皮膚用的清洗劑來清洗掉。
勿使用溶劑或稀釋劑。
如果外觀有發生變化，以及疼痛的話，接受醫師的診斷。
儘快去除污染的衣服。

眼睛接觸

立即用大量乾淨的流水來清洗15分鐘以上。完全清洗眼皮的背面。
盡可能迅速接受醫師的診斷。

食入

誤飲的話，保持靜養，並迅速接受醫師的診斷。
勿吞入嘔吐物。

最重要症狀及危害效應 ：—
對急救人員之防護 ：預防措施建議已在SDS 的第八項說明。
對醫師之提示 ：沒有情報

5. 滅火措施

適用滅火劑 ：碳酸氣體，泡沫，化學乾粉
滅火時可能遭遇之特殊危害 ：—
特殊滅火程序 ：請迅速清除周圍的可燃性物體。
消防人員之特殊防護設備 ：不透氣密閉化學防護服。

6. 洩漏處理方法

個人應注意事項 ：作業時請著用確切的保護器具。
環境注意事項 ：如排往河流等時，注意勿給環境帶來影響。
清理方法 ：沖洗沾染區域，防止廢水排入水溝。

7. 安全處置與儲存方法

處置

請在換氣好的地方使用。
請隨時蓋好容器的蓋子。
請著用適當的保護器具，以免污染皮膚・衣物或進入眼睛等。
使用後，充分洗淨手和臉，勿把手套等污染的保護器具帶入休息場所。

儲存

請保管於涼爽及通風良好處。
避免置放於炎熱及陽光直射處。
為避免品質產生變化，請勿長期保存。

8. 暴露預防措施

工程控制 : 局部設置排氣裝置等，
使作業人員儘量減少與漿料的直接接觸。

控制參數

八小時日時量平均容許濃度 (TWA)	短時間時量平均容許濃度 (STEL)	最高容許濃度 (CEILING)	生物指標 (BEIs)
沒有情報	沒有情報	沒有情報	沒有情報

個人防護設備

呼吸防護 : 請使用防有機氣體用的防毒面具。
如在密封的場所，請使用送氣面具。
手部防護 : 請著用防有機溶劑或化學藥品滲透的手套
眼睛防護 : 請著用保護眼鏡
皮膚及身體防護 : 安全鞋或安全膠靴

衛生措施

工作後儘速脫掉污染之衣物，洗淨後才可再穿戴或丟棄。
工作場所嚴禁抽煙或飲食。處理此物後，須徹底洗手。
維持作業場所清潔。

9. 物理及化學性質

物理形狀

形狀 : 漿體狀
顏色 : 暗綠色
氣味 : 溶劑的氣味
嗅覺值 : 未測定
pH值 : 不適用
熔點 : 未測定
沸點 : 231℃
易燃性 (固體、氣體) : 未測定
分解溫度 : 未測定
閃火點 : 84℃ (開口杯法)
自燃溫度 : 200℃以上
爆炸界線 : 未測定
蒸氣壓 : 未測定
蒸氣密度 : 未測定
密度(比重) : 2.6 g/cm3
溶解性(水) : 不溶性
溶解性(有機溶劑) : 可溶性
辛醇/水分配係數(log Kow) : 未測定
揮發速率 : 未測定

10. 安定性及反應性

安定性	: 通常條件下安定。
反應性	: 在高溫下會反應
應避免之狀況	: 放置於高溫下
應避免之物質	: 酸化劑
危害分解物	: NOx，其他低分子單體

11. 毒性資料

急毒性物質(吞食)	: 第5級
急毒性物質(皮膚)	: 第5級
急毒性物質(吸入:蒸氣)	: 第4級
嚴重損傷/刺激眼睛物質	: 第2B級
皮膚過敏物質	: 第1級
特定標的器官系統毒性物質 - 單一暴露	: 第1級 (呼吸系統)
特定標的器官系統毒性物質 - 重複暴露	: 第1級 (眼, 呼吸器官)

成分本產品

急毒性物質

二甘醇一丁醚	: 經口LD50(大鼠) 5660 mg/kg
乙酸二甘醇單丁基醚	: 經口LD50(大鼠) 6500 mg/kg
松油醇	: 經口LD50(大鼠) 5170 mg/kg
苯甲醇	: 經口LD50(大鼠) 1230 mg/kg

12. 生態資料

水環境之危害物質 - 急性	: 不可能分類
水環境之危害物質 - 慢性	: 不可能分類
持久性及降解性	: 沒有情報
生物蓄積性	: 沒有情報
土壤中之流動性	: 沒有情報
其他不良效應	: 沒有情報

13. 廢棄處置方法

對於廢棄塗料・容器等，請委託有操作許可的工業廢棄物處理業者來處理。
請勿將清洗容器・機械裝置後的廢水直接排往地面或排水溝。
對於由排水處理，燒卻等產生的廢棄物，請根據相關的法律・法規來進行處理，或委託業者來處理。

14. 運送資料

請遵守相關的法律制度。

國際運輸規定：依照IMO/ICAO/IATA的規定進行運輸。

運輸危害分類	: 不符合
包裝類別	: 不符合
聯合國編號 (UN No.)	: 不符合
聯合國運輸名稱	: 不符合
海洋污染物	: 非
特殊運送方法及注意事項	: 沒有情報

15. 法規資料

請遵守相關的法律制度。

16. 其他資料

參考文獻：

1. 日本塗料工業協會發行的「SDS 製作導引書」
2. 對應GHS要求的SDS・標籤製作指南〔混合物（塗料用）〕（日本塗料工業會）
   日本化學工業協會發行的「SDS 安全資料聯製作指南」（改訂2版）
3. 化學工業日報社發行的「13901 的化學商品」
4. 原材料廠家製作「SDS」

本物質安全資料表僅供參考，不具保證用途。
全部成分恐有未知之有害性，請小心使用。

Date: March 14, 2019

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

CHEMICAL PRODUCT NAME	: DP4303W
OTHER MEANS OF IDENTIFICATION	: Conductive material
RECOMMENDED USE OF THE CHEMICAL AND ANY RESTRICTIONS ON USE	: Formulated Material for Electronic Device Manufacturing Industrial use only
NAME OF MANUFACTURER	: NAMICS CORPORATION
NAME OF SECTION	: Quality Assurance Division
ADDRESS	: 3993, Nigorikawa, Kita-ku, Niigata-City 950-3131, Japan
TELEPHONE	: 81-25-258-5577
FAX	: 81-25-258-5511

2. HAZARD IDENTIFICATION

GHS CLASSIFICATION

Physical Hazards

Flammable liquids	: Category 4

Health Hazards

Acute toxicity, oral	: Category 5
Acute toxicity, dermal	: Category 5
Acute toxicity, inhalation (Vapours)	: Category 4
Serious eye damage/eye irritation	: Category 2B
Sensitisation, skin	: Category 1
Specific target organ toxicity, single exposure	: Category 1 (Respiratory system)
Specific target organ toxicity, repeated exposure	: Category 1 (Eye, Respiratory organs)

Any hazard class not listed above is out of classification or not able to classify.

GHS LABEL ELEMENT

PICTOGRAMS

SIGNAL WORDS

Danger

HAZARD STATEMENTS

H227 Combustible liquid
H303+H313 May be harmful if swallowed or in contact with skin
H317 May cause an allergic skin reaction
H320 Causes eye irritation
H332 Harmful if inhaled
H370 Causes damage to organs (Respiratory system)
H372 Causes damage to organs (Eye, Respiratory organs) through prolonged or repeated exposure

PRECAUTIONARY STATEMENTS

Use with adequate protection equipments to avoid contact with skin, mucosa, eyes or clothing.
If chemicals get into eyes, rinse the affected eyes immediately with clean plenty of running water for at least 15 minutes.
Remove all chemicals from contact with victim's eyes, including under the eyelids, arrange for transport to the nearest medical facility for examination by a physician as soon as possible.
If chemicals are contaminated skin wash the all affected areas using a large amount of water and soap or shampoo for skin.
If victim's appearance has changed or the victim has pain, arrange for transport to the nearest medical facility for examination by a physician.

If accidentally swallowed and became feeling ill, keep the victim quiet and arrange for transport to the nearest medical facility for examination by a physician as soon as possible.
If inhaled vapour or gasses and the victim remove from the contamination to fresh air and arrange for transport to the nearest medical facility.
If chemicals have specified storage condition such as storage cool and dark space, must comply with it.
Dispose in accordance with all applicable regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE / MIXTURE : MIXTURE
PRODUCT FAMILY : Conductive material

CHEMICAL INGREDIENTS

COMPONENT	CAS No.	%
Silver	7440-22-4	60~70
Glass frit	trade secret	5~15
Resins	trade secret	1~10
Rosin	8050-09-7	<5
Additives	trade secret	<5
Diethylene glycol monobutyl ether	112-34-5	5~15
Diethylene glycol monobutyl ether acetate	124-17-4	1~10
Terpineol	8000-41-7	<5
Benzyl alcohol	100-51-6	<5

All components required to report under Taiwan OSHA are disclosed.

4. FIRST-AID MEASURES

THE FIRST AID MEASURES FOR DIFFERENT EXPOSURE ROUTES

INHALATION

Remove the victim from the contamination immediately to fresh air.
If breathing is weak, irregular or has stopped, open his airway, loosen his collar and belt and administer artificial respiration.
And refer for medical attention.

SKIN CONTACT

Remove all contaminated clothing, shoes and socks from the affected areas as quickly as possible, cutting them off if necessary.
Wash the affected areas under tepid running water using a mild soap.
If irritation persists, arrange for examination and treatment by a physician as soon as possible.

EYE CONTACT

Gently rinse the affected eyes, including under the eyelids, with clean water for at least 15 minutes.
Remove all chemicals from contact with the victim's eyes immediately.
Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

INGESTION

Keep the victim warm and quiet.
Do not give an unconscious person anything to drink.
Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.
If the victim stops breathing, wipe away any remaining material off the lips and clear the airway and administer artificial respiration.

MOST IMPORTANT SYMPTOMS / EFFECTS, ACUTE AND DELAYED : Not Available
PROTECTION OF FIRST-AIDERS : Precautions recommendations are contaioned in Section 8 of the SDS.
NOTES TO PHYSICIANS : No information

5. FIRE-FIGHTING MEASURES

SUITABLE FIRE-EXTINGUISHING MEDIA	: Carbon dioxide, Foam, Dry chemical powder
SPECIFIC HAZARDS MAY BE ENCOUNTERED DURING FIRE-FIGHTING	: Not Available
SPECIFIC FIRE-FIGHTING PROCEDURES	: Shut off all sources of ignition; No flares, smoking or flames in area.
SPECIAL EQUIPMENT FOR THE PROTECTION OF FIREFIGHTERS	: Gas tight chemical resistant suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS	: Wear proper protective equipment.
ENVIRONMENTAL PRECAUTIONS	: Prevent from spreading or entering into drains, ditches or rivers.
METHODS FOR CLEANING UP	: Wash area and prevent runoff into drains.

7. HANDLING AND STORAGE

HANDLING

Use only in the well-ventilated areas.
Keep container tightly closed.
Prevent build-up of electrostatic charges (e.g., by grounding).
Use reduced-sparking hand-tools.
Avoid contact with skin or eyes.

STORAGE

Store in cool, well-ventilated location.
Keep away from heat or sunlight.
Avoid long storage periods since the product degrades with age.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS : Prevent vapor buildup by providing adequate ventilation during and after use.

CONTROL PARAMETERS

TIME WEIGHTED AVERAGE (TWA)	SHORT TERM EXPOSURE LIMIT (STEL)	CEILING VALUE	BIOLOGICAL EXPOSURE INDICES (BEIs)
No information	No information	No information	No information

PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION	: Chemical cartridge respirator with an organic vapor cartridge. In confined or poorly ventilated areas, use an airline respirator.
HAND PROTECTION	: Chemically impervious gloves
EYE PROTECTION	: Safety glasses
SKIN AND BODY PROTECTION	: Safety footwear or safety gumboots

HYGIENE MEASURES

After take off as soon as possible contamination of clothing, then wash before wearing or discarded.
Prohibited workplace smoking cigarettes or eating. Handling of this, the need to wash hands thoroughly.
Maintain the workplace clean.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STAGE	
FORM	: Viscous liquid
COLOR	: Dark green
ODOR	: Characteristic odor
ODOR THRESHOLD	: No data
pH	: Not applicable
MELTING POINT	: No data
BOILING POINT	: 231 degrees C
FLAMMABILITY (SOLID, GAS)	: No data
DECOMPOSITION TEMPERATURE	: No data
FLASH POINT	: 84 degrees C (Open cup flash point test)
AUTOIGNITION TEMPERATURE	: Higher than 200 degrees C
EXPLOSION LIMITS	: No data
VAPOR PRESSURE	: No data
VAPOR DENSITY	: No data
DENSITY	: 2.6 g/cm3
SOLUBILITY IN WATER	: Insoluble
SOLUBILITY IN ORGANIC SOLVENTS	: Soluble
PARTITION COEFFICIENT (N-OCTANOL/WATER,LOG KOW)	: No data
EVAPORATION RATE	: No data

10. PHYSICAL HAZARD (STABILITY AND REACTIVITY)

STABILITY	: Product is considered stable.
REACTIVITY	: Reaction at high temperature
CONDITIONS TO AVOID	: Excessive overheating
INCOMPATIBILITY	: Oxidizing agents
DECOMPOSITION PRODUCTS	: Toxic fumes of Carbon monoxide, Carbon dioxide, Nitrogen oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity, oral	: Category 5
Acute toxicity, dermal	: Category 5
Acute toxicity, inhalation (Vapours)	: Category 4
Serious eye damage/eye irritation	: Category 2B
Sensitisation, skin	: Category 1
Specific target organ toxicity, single exposure	: Category 1 (Respiratory system)
Specific target organ toxicity, repeated exposure	: Category 1 (Eye, Respiratory organs)

COMPONENT OF THIS PRODUCT

ACUTE TOXICITY

Diethylene glycol monobutyl ether	: Oral LD50 (rat) 5660 mg/kg
Diethylene glycol monobutyl ether acetate	: Oral LD50 (rat) 6500 mg/kg
Terpineol	: Oral LD50 (rat) 5170 mg/kg
Benzyl alcohol	: Oral LD50 (rat) 1230 mg/kg

12. ECOLOGICAL INFORMATION

Hazardous to the aquatic environment, acute toxicity	: Not available
Hazardous to the aquatic environment, chronic toxicity	: Not available
PERSISTENCE AND DEGRADABILITY	: No information
BIOACCUMULATIVE POTENTIAL	: No information
MOBILITY IN SOIL	: No information
OTHER ADVERSE EFFECTS	: No information

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.
Containers must be cleaned up, then recycle or dispose of in accordance with regulations.

14. TRANSPORT INFORMATION

Follow all regulations in your country.

International regulations : based on IMO / ICAO / IATA.

UN CLASS	: Not applicable
PACKING GROUP	: Not applicable
UN NUMBER	: Not applicable
Proper shipping name	: Not applicable
Marine Pollutant	: Not applicable
SPECIAL PRECAUTIONS	: No information

15. REGULATORY INFORMATION

Follow all regulations in your country.

16. OTHER INFORMATION

REFERENCE

1. Material Database for Safety Data Sheet
   Japan Paint Manufacturers Association
2. Guidebook on the preparation of Safety Data Sheet & Labelling in conformity with GHS
   Japan Paint Manufacturers Association
3. 13901 chemical products
   The Chemical Daily Co., Ltd.
4. Safety Data Sheet of raw material manufacturer

The information herein is given in good faith, but no warranty, express or implied, is made.
All materials may present unknown hazards and should be used in caution.

SAFETY DATA SHEET

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

Material：Glass paste

Code： JG7097

Vendor: JOYIN CO,, LTD.

Add: No.160, Ln. 623, Shenshen Rd., Yangmei City,Taoyuan,Taiwan 32651

Tel :(886)-3-4755094.4785094.4756600

Fax: (886)-3-4756835

http://www.joyin.com.tw/

SECTION 2 – HAZARD(S) IDENTIFICATION EMERGENCY OVERVIEW

Acute Effect

Health Effect：Irritating to eye and skin, may cause allergic reactions in sensitive Individuals.

Excessive contact with silver can cause allergy, skin discoloration

Environment Effect：Not Available

Physical & Chemical Danger： Not Available

Special danger： Not Available

SECTION 3 – COMPOSITION AND INFORMATION ON INGREDIENTS

Substance Name (Material Group)	CAS No.	Content
Lead free glass/alumina mixed powder	-	30-70%
Co-Ni-Mn-Cr-Fe spinel powder		5-20%

Ethylene glycol monobutyl ether	111-76-2	10-30%
Ethyl Cellulose	9004-57-3	4-12%

SECTION 4 – FIRST- AID MEASURES

Inhalation: Prolonged inhalation may irritate nose ,throat, lungs .
Do not breathe dust or fume if material is heated .
Keep container closed when not in use .
Remove to fresh air. Get medical attention for any breathing difficulty
In case of inhalation immediately remove person to fresh air.
Apply artificial respiration as required.

Ingestion: Not expected to require first aid measures. If large amounts were swallowed, give water to drink and get medical adivice .

Skin contact: Wear suitable protective clothing ,gloves and eye/face protection .
In case of skin contact , flush skin with plenty of water. Wash contaminated clothing before re-use .

Eye contact:Wear suitable protective clothing ,gloves and eye/face protection .
In case of contact with eyes , rinse immediately with plenty of water and seek medical advice .

Main symptom and hazardous effect: Not Available

Defense for emergency technician: Not Available

Hint for Physician: Not Available

SECTION 5 – FIRE-FIGHTING MEASURES

Fire : Not considered to be a fire hazard .

Explosion: Not considered to be a Explosion hazard .

Fire Extinguishing Media: Use any means suitable for extinguishing surrounding fire.

Special information: Keep away from sparks and open flames. In case of fire,use water spray,dry chemica or carbon dioxide extinguishers .

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Oxide fume may be released when heated .

Danger when fire extinguishing: Thermal breakdown of this product during fire or very high heat conditions may evolve the following hazardous decomposition products: Carbon
Oxides And traces of incompletely burned carbon compounds.
Special Fire extinguishing Procedures: Wear self-contained breathing apparatus.
It is desirable to use alcohol-type foam liquid for water soluble solvent
Defensive fitment for firefighters: Self-contained breathing apparatus and protective Fire fighting clothing(includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is Not available or not used, fight fire from a protected location or safe distance

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal attention: Spray solvent at first then suitable absorbents clean up the material.
Environmental attention: No known applicable information.

Disposal: Keep container closed when not in use, wash thoroughly after handling

SECTION 7 – HANDLING AND STORAGE

Disposal: Avoid contact with eyes. Avoid prolonged or repeated skin contact. Minimize exposure
By inhalation. Incinerate or place is a suitable container for disposal by a licensed contractor.

Storage: Store in a cool dry location with adequate ventilation. Store in tightly closed container.

Keep away from open flame and heat sources. Prevent contact and storage with incompatible materials.

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Control: Use process enclosures, local exhaust ventilation, or other engineering Controls to keep airborne levels below recommended exposure limits. If user operations generate dust, Fume or mist, use ventilation to keep exposure to airborne contaminate below the exposure limit.

Personal Protective Equipment: Lab coat

Breath Protective fitment: Dust respirator. Be sure to use an approved/certified respirator or Equivalent. Wear appropriate respirator when ventilation is inadequate.

Eye ware: Splash goggles

Hand ware: Gloves

Skin and Body protective ware: Wear protective clothing as required to prevent skin contact. Suggested protective clothing may not be adequate for a specific process. Consult a specialist before using.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Color: Black	Order: Faint Order
Ph value: Not Applicable	Boiling point: 200-300℃
Decomposition Temp. Not Available	Flash point: 124 ℃
Auto-ignition: Not Applicable	Explosion limit: Not Applicable
Steam Pressure: Not Applicable	Exhalation Density: Not Applicable
Density：1~3	Dissolubility: Not Applicable

SECTION 10 – STABILITY AND REACTIVITY

Stability: The product is stable.

Possible danger effect in special status: Avoid storage in open containers, exposure to open flame or exposure to incompatible substances. May generate flammable hydrogen gas on Contact with acids. Bases or oxidizing materials.

Preventive Status: Heat, Flames, Sparks, and other Sources of ignition.
Preventive Material: Water, Strong Oxidizing Agent, Strong Acid, Strong Alkaline.
Hazardous decomposition: Carbon Mono Oxide, Carbon Dioxide Aldehydes.

SECTION 11 – TOXICOLOGICAL INFORMATION

Inhalation : May cause irritation to the respiratory tract . Symptoms may include coughing and shortness of breath. Inhalation can cause a flu-like illness (metal fume fever). This 24-to 48-hour illness is characterized by chill, fever, aching muscles, dryness in the mouth and throat and headache .

Skin Contact : Not expected to be a health hazard from skin exposure

Eye Contact : Not expected to be a health hazard

Aggravation of Pre-existing Conditions:Persons with a pre-existing heart condition or impaired respiratory function may be more susceptible to the effects of this substance

Local effect: Fumes and dust may irritate eyes, digestive system and respiratory tract.
Allergy: Not available

Chronic Intoxication: Prolonged and repeated exposure to tin oxide fumes may result
In Benzene pneumoconiosis.

Special effect: Not available

SECTION 12 – ECOLOGICAL INFORMATION

Suspicious ecological effects: Possibly hazardous short term degradation products Are not likely. However, long-term degradation products may arise.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal: Waste must be disposed of in accordance with federal, state and local Environmental control regulations.

SECTION 14 – TRANSPORT INFORMATION

International conveyance regulation: Not available

ID number: Not available

Local Conveyance regulation: Not available

Special Provision: Not available

SECTION 15 – REGULATORY INFORMATION

Regulation available: Not available

SECTION 16 – OTHER INFORMATION

Reference Not available

Maker

Company: JOYIN CO,, LTD.

address: A No.160, Ln. 623, Shenshen Rd., Yangmei City,Taoyuan,Taiwan 32651

Tel :(886)-3-4755094.4785094.4756600

Fax: (886)-3-4756835

SAFETY DATA SHEET

Date Updated: 16/10/2016
Version: 2

Section 1 - Identification

Product Name: **Nickel Sulfamate**
Company: **R BRIGHT Technology Co.,Ltd**
Address: **No.5, Ln. 61, Zhongxing 1st St., Luzhu Dist., Taoyuan City 338, Taiwan (R.O.C.)**
Tel:: **886-3-323-3415**
Fax: **886-3-323-8402**
Emergency Phone: **886-3-323-3415**

Section 2 - Hazards Identification

GHS Classification:

Acute Toxicity, Oral (Category 4)
Eye Irritation (Category 2)
Respiratory Sensitization (Category 1)
Skin Sensitization (Category 1)
Carcinogenicity (Category 2)

GHS Label:

Signal Word: Danger

Environmental Overview

Aquatic Toxicity - Chronic (Category 3

Hazard statements

H302 Harmful if swallowed
H312 Harmful in contact with skin/dermal
H317 May cause allergic skin reaction
H319 Cause serious eye irritation
H322 Harmful by inhalation
H334 May cause allergic asthmatic symptoms or breathing difficulties if inhaled
H351 Suspected of causing cancer
H412 Harmful to aquatic life with long lasting effects

Precautionary statements

P261 Avoid breathing dust/fume/gas/mist/vapors/spray
P264 Wash thoroughly after handling
P270 Do not eat or drink or smoke when using this product
P271 Use only outdoors or in a well ventilated area
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment
P280 Wear respiratory protection, protective gloves, and eye/face protection.
P281 Use personal protective equipment as required.
P285 In case of inadequate ventilation wear respiratory protection
P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P330 Rinse mouth
P304+P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or

doctor/physician.
P305+P351 IF IN EYES: Rinse cautiously with water for several minutes. Remove
+P338 contact lenses, if present and easy to do. Continue rinsing
P337+P313 If eye irritation persists: Get medical advice/attention.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention
P363 Wash contaminated clothing before reuse.
P308+P313 If exposed or concerned. Get medical advice/attention
P405 Store locked up.
P501 Dispose of contents/container to a facility as required by law.

Section 3 - Composition/Information on Ingredient

Ingredient Name	CAS #	EINES	Percent
Nickel sulfamate	13770-89-3	237-396-1	40~60% $Ni(SO_3NH_2)$-xH_2O
Water	7732-18-5	231-791-2	Balance

Section 4 - First Aid Measures

General Advise:

Consult a physician. Show this material safety data sheet to the doctor inattendance. Move out of dangerous area. In all cases be prepared to treat for shock

Eye:

Eye irritation. Flush immediately with large amounts of water for at least 15 minutes.
Eyelids should be held away from the eyeball to ensure thorough rinsing.

Skin:

Wash affected area with soap and water for at least 15 minutes, especially under fingernails and around cuticles. Remove clothing and shoes that came in contact. Wash contaminated clothing before reuse. Thoroughly clean shoes before reuse.

Inhalation:

If affected, remove individual to fresh air. If breathing is difficult, administer oxygen. Avoid mouth-to-mouth resuscitation.

Section 5 - Fire Fighting Measures

Suitable Extinguishing Media:

In all cases this material does not support combustion. Water, water fog, and/or CO2 may be used to cool fire-exposed storage containers, structures and to protect personnel.

Fire Fighting Procedures:

Do not flush down sewers or other drainage systems. Material is harmful to aquatic life.

Unusual Fire and Explosion Hazards:

None. Material is denser than water and will mix completely into excess water when allowed to do so.

Combustion Products:

Extremely high temperatures may remove water by evaporation, then dehydration, and lead to thermal decomposition releasing nickel oxide, sulfur dioxide (SO2), and ammonia (NH3).

Section 6 - Accidental Release Measures

Keep unnecessary and/or untrained people away. Isolate spill area and avoid tracking through liquid. Dike and prevent runoff to drains or sewers. For small spills, cover with lime and then scoop into polyethylene drums for later disposal. Large spill may be pumped directly into a storage container for later disposal. Do not wash residue to drain or sewer. Refer to Section 15 for spill/release reporting information.

Section 7 - Handling and Storage

Handling

Do not get in eyes, on skin, or on clothing. Do not breathe mists. Keep containers closed when not being

used. Use only with adequate ventilation. Use good personal hygiene practices. After handling wash hands before eating, drinking, or smoking. Remove contaminated clothing and protective equipment before entering eating areas. Remove contaminated clothing and clean before reuse.

Storage

Store in tightly closed containers in a well-ventilated area. Protect from physical damage. Empty containers may contain hazardous residue.

Section 8 - Exposure Controls

Component	CAS-No.	Value	Control Parameters	Basis
Nickel Sulfamate	13770-89-3	TWA	1 mg/m3	USA. OSHA - Table Z-1 Limits for air contaminants
		TWA	0.1 mg/m3	USA. OSHA- Table Z-1 Limits for air contaminants 1910.1000
		TWA	0.015 /m3	USA. NIOSHA Recommended Exposure Limits
Remarks	Potential Occupational Carcinogen			

Engineering Controls:

Local exhaust ventilation may be necessary to control air contaminants to their exposure limits. The use of local ventilation is recommended to control emissions near the source. Provide mechanical ventilation for confined spaces.

Personal Protective Equipment (PPE)

Eye Protection:

Wear chemical safety goggles or face shield. Have eye-wash stations available where eye contact can occur.

Skin Protection:

Avoid skin contact. Wear rubber or neoprene gloves that are impervious to conditions of use.

Respiratory Protection:

Under mist free conditions no respiratory protection should be worn. Should TWA limits be exceeded a NIOSH approved respirator for mist is generally acceptable for concentrations up to 100 times the PEL. Respiratory protection must be provided in accordance with OSHA 29 CFR 1910.134

Section 9 - Physical/Chemical Properties

Room Temperature Appearance: Clear green liquid
Odor: None
pH: 4.0-4.7
Flashpoint: Not Applicable
Auto ignition Temperature: Not Applicable
Upper/lower Flammability Limits: Not Applicable
Danger of explosion: None
Boiling Point: As water
Melting Point: Crystallizes at 34°F (1°C)
Vapor Pressure: As water
Evaporation rate: As water
Vapor Density: As water
Specific Gravity: 1.4 - 1.6
Molecular Formula: $Ni(SO3NH2)2 \cdot 4H2O$
Molecular Weight: 322.94

Section 10 - Stability and Reactivity

Stability/Incompatibility:

Strong acids will decompose sulfamate into ammonium sulfate.

Hazardous Reactions/Decomposition Products:

Extremely high temperatures may lead to thermal decomposition releasing nickel oxide, sulfur dioxide (SO2),

and ammonia (NH3). High temperatures will produce nickel ammonium sulfate.

Section 11 - Toxicological Information

Signs and Symptoms of Overexposure:
Eye and nasal irritation, dermatitis with itching
Eye Contact:
Cause irritation
Skin Contact:
Not absorbed through skin. May cause dermatitis or allergic skin reactions.
Inhalation:
Inhalation of mist can cause upper respiratory tract irritation.
Ingestion:
Can cause gastrointestinal disorders.
Carcinogenicity:
According to OSHA CFR 1910-1200 (Hazard Communication) Nickel and certain Nickel compounds are deemed to be possible cancer hazards. This is based on assessment by the U.S. NTPC (National Toxicology Program) mat they may reasonably be anticipated to be carcinogens and an assessment of IARC (International Agency of Research on Cancer) which concluded that there was limited evidence of carcinogenicity to humans. There has been no evidence that workers exposed to soluble Nickel Salts in their use have demonstrated any increased risk of respiratory cancer. Nickel compounds are listed by IARC[d] as Group 1: carcinogenic to humans.
Acute Toxicity Values:
No information is available for nickel sulfamate

Section 12 - Ecological Information

When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater. When released into water, this material is not expected to biodegrade. When released into water, this material is not expected to evaporate significantly. This material does not significantly bioaccumulate. No information available is specific for nickel sulfamate.

Section 13 - Disposal Considerations

- Please consult us in case of recycling.
- Disposal should be in accordance with applicable regional, national and local laws and regulations.
- When order to dispose the remainder to the private or public waste disposer, inform the physic-chemical and health hazards of this substance.
- Container should be cleaned up prior to recycling or dispose in accordance with applicable regional, national and local standard method.
- Empty container should be cleaned up prior to disposal.

Section 14 - Transport Information

U.S. Department of Transportation (DOT)
UN Number: UN3082 Class 9 Packing Group: III
Proper Shipping Name: Environmentally hazardous substances, Liquid N.O.S. (Nickel Sulfamate)
Labels Required: 9

IATA / ICAO
UN Number: UN3082 Class 9 Packing Group: III
Proper Shipping Name: Environmentally hazardous substances, Liquid N.O.S. (Nickel Sulfamate)
Labels Required: 9

International Maritime Organization (IMDG)
UN Number: UN3082 Class 9 Packing Group: III
Proper Shipping Name: Environmentally hazardous substances, Liquid N.O.S. (Nickel Sulfamate)
Labels Required: 9, Marine Pollutant

Section 15 - Regulatory Information

United States Federal Regulation:

Toxic Substances Control Act (TSCA):
Under normal operation conditions involving an aqueous solution or as the hexahydrate, Nickel Sulfamate is not listed on the TSCA Inventory List. Anhydrous Nickel Sulfamate (CAS # 13770-89-3) is listed on the TSCA Inventory List

Clean Water Act (CWA):
No RQ assigned

Clean Air Act (CAA):
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Superfund Amendments and Reauthorization Act (SARA) Title III Information:
This material is listed in Section 313 under the category of Nickel Compounds.

State Regulations:

California:
Nickel compounds, in general, are listed under Proposition 65 as cancer causing materials.

International Regulations

Canadian Environmental Protection Act:
CAS # 13770-89-3 and 124594-15-6 are grouped into the category "Nickel, water-soluble inorganic compounds, n.o.s." at a concentration of greater than 1% wt/wt.

Canadian Workplace Hazardous Materials Information System (WHMIS):
Not listed

European Union Regulations:

European Inventory of Existing Chemicals (EINECS):
Anhydrous Nickel Sulfamate is included in the ECICS as EC # 237-396-1. At this time it is not clear if the same number is being used for hydrated forms of Nickel Sulfamate.

EU Classification, Risk (R) and Safety (S):
This substance is not listed in a priority list (as foreseen under Council Regulation (EEC) No 793/93 on the evaluation and control of the risks of existing substances. Several Risk and Safety Phrases have been proposed, but not finalized, at the time of preparation of this SDS.

R22- Harmful if swallowed.
R40- Limited evidence of a carcinogenic effect
R41- Risk of serious damage to the eyes
R43- May cause sensitization by skin contact
R50- Very toxic to aquatic organisms
R53- May cause long-term adverse effects in the aquatic environment
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
536- Wear suitable protective clothing
537- Wear suitable gloves
S39- Wear eye / face protection
S60- This material and its container must be disposed of as hazardous waste

Section 16 - Other Information

References:

1 European Center of Ecotoxicology and Toxicology of Chemicals(ECETOC) ; Technical Report No. 33 (1989)
2 WHO/IPCS：Environmental Health Criteria（EHC） No.108 (1991)
3 JSOH ; Recommendation of Occupational Exposure Limits. J. Occup. Health. (2005)<Japanese>

4 IARC ; IARC Monographs on the Evaluation of Carcinogenic Risk to Humans. Vol. 49 (1990)
5 USDHHS ; The Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles. (2005)
6 US NTP ; NTP Database Search (2005)
7 ACGIH ； Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices. 7th Ed. (2001)
8 CERI ; Hazard data sheet 97-19(1) (1998) <Japanese>
9 "Biodegradation and Bioaccumulation Data of Existing Chemicals based on the CSCL Japan." ed by Chemicals Inspection & Testing Institute Japan (1992)
10 "Biodegradation and Bioaccumulation Data of Existing Chemicals based on the CSCL Japan." ed by Chemicals Inspection & Testing Institute Japan (1992)
11 GHS Classification of Nickel (Chemical Management Center, National Institute of Technology and Evaluation ; http://www.safe.nite.go.jp/english/dbi.html , 2007)
12 "2004 Emergency Response Guidebook. 2nd revised ed." Japanese ed. Japan Chemical Industries Association (2005)

The information above is believed to be accurate and represents the best information currently available to us and has been sought to correct. The data and information is for reference only, please according to user application requirements, solely responsible for determining its availability

Revision Date Oct 16, 2016

Prepared By

R Bright Technology Co., Ltd.
No.5, Ln. 61, Zhongxing 1st St., Luzhu Dist., Taoyuan City 338, Taiwan (R.O.C.)Telephone: +886-3-323-3415

SAFETY DATA SHEET

Date Updated: 16/10/2016
Version: 5

Section 1 - Identification

Product Name: **Tin Tech Tin Conc. 300g/L**
Company: **R BRIGHT Technology Co.,Ltd**
Address: **No.5, Ln. 61, Zhongxing 1st St., Luzhu Dist., Taoyuan City 338, Taiwan (R.O.C.)**
Technical Phone: **886-3-323-3415**
Fax: **886-3-323-8402**
Emergency Phone: **886-3-323-3415**

Section 2 - Hazards Identification

GHS Classification:

Hazardous in case of skin irritation/corrosion: Category 1B
Very hazardous in case of eye irritation/damage: Category 1
Skin Sensitive: Category 1
Acute Toxic: Category 4

GHS Label:

Signal Word: Danger

Hazard-determining components of labeling:
tin(II) methanesulphonate

Hazard statements
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.

Precautionary statements
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification
D2B - Toxic material causing other toxic effects
E - Corrosive material

Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)
Health (acute effects) = 3
Flammability = 1
Physical Hazard = 1

Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

Section 3 - Composition/Information on Ingredient

Substance Name
TinTech Tin Conc.300g/L make up Conc.

Ingredient Name	CAS #	Percent	SARA 313
Stannous methanesulfonic acid	53408-94-9	60%	No
Methanesulfonic acid	75-75-2	1~ 10%	No
Water	7732-18-5	15~35%	No

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician. Do not induce vomiting.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE

Immediately flush the eye with plenty of water for at least 20 minutes, holding the eye open. Obtain medical attention immediately.

Section 5 - Fire Fighting Measures

FLASH POINT

N/A

AUTOIGNITION TEMP

N/A

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Cover with dry lime or soda ash, pick up, keep in a closed container, and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use only in a chemical fume hood.

STANNOUS METHANESULFONIC ACID: (as organic Sn) ACGIH: TLV 0.1mg/m3 8h TWA. ACGIH: STEL 0.2mg/m3 15min TWA. OSHA: PEL 0.1mg/m3 8h TWA. Can be absorbed through skin

METHANESULFONIC ACID:

None assigned

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

EYE PROTECTION

Chemical goggles and face shield.

BODY PROTECTION:

Rubber or neoprene apron

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Clear to amber liquid
pH	<1
BP/BP Range	N/A
MP/MP Range	N/A
Freezing Point	N/A
Vapor Pressure	N/A
Vapor Density	N/A
Saturated Vapor Conc.	N/A
SG/Density	1.5 g/cm3
Bulk Density	N/A
Odor Threshold	Mild
Volatile%	N/A
VOC Content	Not applicable
Solvent Content	N/A
Evaporation Rate	N/A
Viscosity	N/A
Surface Tension	N/A
Partition Coefficient	N/A
Decomposition Temp.	N/A
Flash Point	Not Flammable
Explosion Limits	N/A
Flammability	N/A
Autoignition Temp	N/A
Optical Rotation	N/A

Miscellaneous Data	N/A
Solubility	Completely soluble

Section 10 - Stability and Reactivity

STABILITY

Stable under normal conditions

CONDITIONS TO AVOID:

Contact with incompatible materials - High temperatures

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide - carbon dioxide - oxides of sulfur
CONTACT WITH METALS MAY EVOLVE FLAMMABLE HYDROGEN GAS.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ACUTE DATA:

Methanesulfonic Acid: Oral LD50 (rat) 2000mg/kg. Single application to the rabbit eye produced severe conjunctival irritation and corneal damage. A single 4h semi-occlusive application to intact rabbit skin produced burns (full thickness destruction of skin).

Section 12 - Ecological Information

MOBILITY:

The product will dissolve rapidly in water. The product is poorly absorbed onto soils or sediments. The product will leach into soil

PERSISTENCE/DEGRADABILITY

This products contains inorganic salts and/or elements which can persist indefinitely. The term "biodegradation" does not apply to inorganics. The organic part of the product is expected to be readily biodegradable

BIO-ACCUMULATUON:

The inorganic(s) is taken up by plants and animals and used as an essential nutrient. The organic part of this product is not expected to bioaccumulate.

ECOTOXITY

The product may be harmful to aquatic organisms

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Corrosive liquid, acidic, organic, n.o.s.

IATA

UN Proper Shipping Name: Corrosive Liquid, acidic, organic, n.o.s

UN Number: UN3265
Hazard Class: 8
Packing Group: II
Marine Pollutant: none.

Section 15 - Regulatory Information

Enforcement Rules of Labor Safety and Health Law
Regulation of Labeling and Hazard Communication of Dangerous and Harmful Materials Criteria
Governing Methods of and Facilities for Storage, Clearance and Disposal of Industrial Wastes

Section 16 - Other Information

References:
RTECS Database 2010
Chem Watch Database 2010
OHS MSDS Database 2010
HSDB Database 2010
Global Harmonized System Database

The information above is believed to be accurate and represents the best information currently available to us and has been sought to correct. The data and information is for reference only, please according to user application requirements, solely responsible for determining its availability

Revision Date Oct 16, 2016
Prepared By
R Bright Technology Co., Ltd.
No.5, Ln. 61, Zhongxing 1st St., Luzhu Dist., Taoyuan City 338, Taiwan (R.O.C.)Telephone: +886-3-323-3415

TEST REPORT

APPLICANT : TEMEN TECH

ADDRESS : 106-10, Gwahakdanji-ro,
Gangneung-si, Gangwon-do, Korea

REPORT NO. RT21R-S5014-003-E-RA DATE: Aug. 17, 2021

SAMPLE DESCRIPTION	: The following submitted sample(s) said to be:-
NAME/TYPE OF PRODUCT	: Ceramic powder
NAME OF MATERIAL	: Glass Ceramic
SAMPLE ID NO.	: RT21R-S5014-003
ITEM NO.	: TCP-L7SH, TCP-L7NISW, TCP-L7NOS
MANUFACTURER/VENDOR	: TEMEN TECH
SAMPLE RECEIVED	: Aug. 04, 2021
TESTING DATE	: Aug. 04, 2021 ~ Aug. 17, 2021
TEST METHOD(S)	: Please see the following page(s).
TEST RESULT(S)	: Please see the following page(s).

* Note 1 : The test results presented in this report refer only to the object tested.
* Note 2 : This report shall not be reproduced except in full without the written approval of the testing laboratory.
* Note 3 : The item no. is assigned by client and indicated according to their requirement and guarantee letter.

Approved by,

Jade Jang / Lab. Technical Manager

Authorized by,

Bo Park / Lab. General Manager

Authenticity check

Intertek Testing Services Korea Ltd.
Seoul Office: Tel : 02-6090-9500 Fax : 02-3409-0025 Web Site : intertek.co.kr
Seoul Lab. Address : 7, Achasan-ro 5-gil, Seongdong-gu, Seoul, 04793 Korea
Ulsan Lab. Address : 34, Yongam-gil, Chongryang-myeon, Ulju-gun, Ulsan 44989 Korea

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TEST REPORT

REPORT NO. RT21R-S5014-003-E-RA DATE: Aug. 17, 2021

SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder

TEST ITEM	UNIT	TEST METHOD	MDL	RESULT
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 Edition 1.0 : 2013, by acid digestion and determined by ICP-OES	0.5	N.D.
Lead (Pb)	mg/kg		5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4 : 2013/AMD1 : 2017, by acid digestion and determined by ICP-OES	2	N.D.
Hexavalent Chromium (Cr^{6+})	mg/kg	With reference to IEC 62321-7-2 Edition 1.0 : 2017, by alkaline/toluene digestion and determined by UV-VIS Spectrophotometer	8	N.D.
Polybrominated Biphenyl (PBBs)				
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6 Edition 1.0 : 2015, by solvent extraction and determined by GC/MS	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.
Polybrominated Diphenyl Ether (PBDEs)				
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6 Edition 1.0 : 2015, by solvent extraction and determined by GC/MS	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.

Tested by : Jooyeon Lee, Chano Kim, Hayan Park

Notes : mg/kg = ppm = parts per million
< = Less than
N.D. = Not detected (<MDL)
MDL = Method detection limit

Intertek Testing Services Korea Ltd.
Seoul Office: Tel : 02-6090-9500 Fax : 02-3409-0025 Web Site : intertek.co.kr
Seoul Lab. Address : 7, Achasan-ro 5-gil, Seongdong-gu, Seoul, 04793 Korea
Ulsan Lab. Address : 34, Yongam-gil, Chongryang-myeon, Ulju-gun, Ulsan 44989 Korea

TEST REPORT

REPORT NO. RT21R-S5014-003-E-RA DATE: Aug. 17, 2021

SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder

TEST ITEM	UNIT	TEST METHOD	MDL	RESULT
Bromine (Br)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.
Chlorine (Cl)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.
Fluorine (F)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.
Iodine (I)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.
Beryllium (Be)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Antimony (Sb)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Hexabromocyclododecane (HBCDD)	mg/kg	With reference to IEC 62321-9(111/409/CD), by solvent extraction and determined by LC/MS and GC/MS	10	N.D.
Perfluorooctanoic acid (PFOA)	mg/kg	With reference to DIN CEN/ TS 15968, by ultrasonic extraction and determined by LC/MS or LC/MS/MS	0.01	N.D.
Perfluorooctane sulfonate (PFOS)	mg/kg	With reference to DIN CEN/ TS 15968, by ultrasonic extraction and determined by LC/MS or LC/MS/MS	0.01	N.D.

Tested by : Hyojoo Kim, Jooyeon Lee, Hayan Park

Notes : mg/kg = ppm = parts per million
< = Less than
N.D. = Not detected (<MDL)
MDL = Method detection limit

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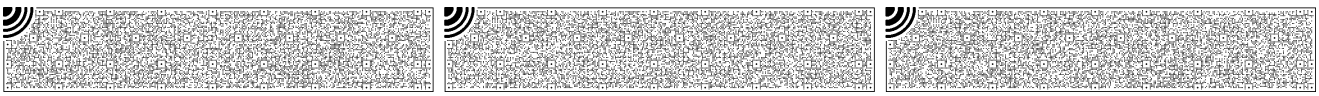
Ulsan Lab. Address : 34, Yongam-gil, Chongryang-myeon, Ulju-gun, Ulsan 44989 Korea



TEST REPORT

REPORT NO. RT21R-S5014-003-E-RA DATE: Aug. 17, 2021

SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder

TEST ITEM	CAS NO.	UNIT	TEST METHOD	MDL	RESULT
Dibutyl phthalate (DBP)	84-74-2	mg/kg	With reference to IEC 62321-8 Edition 1.0 : 2017, by solvent extraction and determined by GC/MS	50	N.D.
Di(2-ethylhexyl) phthalate (DEHP)	117-81-7	mg/kg		50	N.D.
Di-n-octyl phthalate (DNOP)	117-84-0	mg/kg		50	N.D.
Diisononyl phthalate (DINP)	28553-12-0 68515-48-0	mg/kg		100	N.D.
Diisodecyl phthalate (DIDP)	26761-40-0 68515-49-1	mg/kg		100	N.D.
Benzyl butyl phthalate (BBP)	85-68-7	mg/kg		50	N.D.
Diisobutyl phthalate (DIBP)	84-69-5	mg/kg		50	N.D.
Di-n-pentyl phthalate (DPP)	131-18-0	mg/kg		50	N.D.
Di-n-hexyl phthalate (DNHP)	84-75-3	mg/kg		50	N.D.

Tested by : Hayan Park

Notes : mg/kg = ppm = parts per million
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N.D. = Not detected (<MDL)
MDL = Method detection limit

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TEST REPORT

REPORT NO. RT21R-S5014-003-E-RA DATE: Aug. 17, 2021

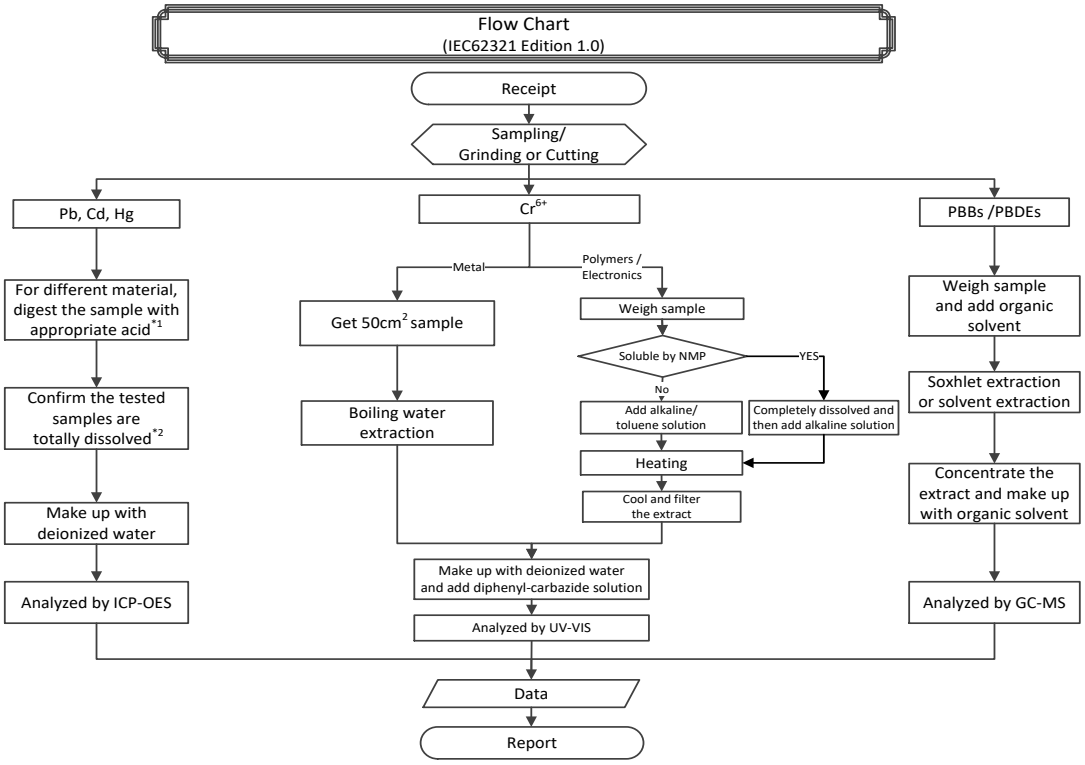
SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder

* View of sample as received;-

TEST REPORT

REPORT NO. RT21R-S5014-003-E-RA DATE: Aug. 17, 2021

SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder



Remarks :
*1 : List of appropriate acid :

Material	Acid added for digestion
Polymers	HNO_3, HCl, HF, H_2O_2, $H3BO_3$
Metals	HNO_3, HCl, HF
Electronics	HNO_3, HCl, H_2O_2, HBF_4

*2 : The samples were dissolved totally by pre-conditioning method according to above flow chart.

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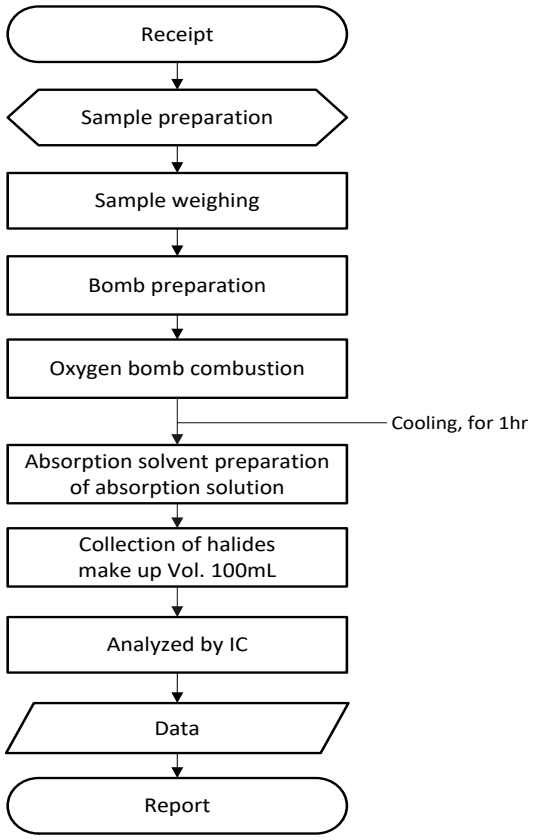
TEST REPORT

SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder

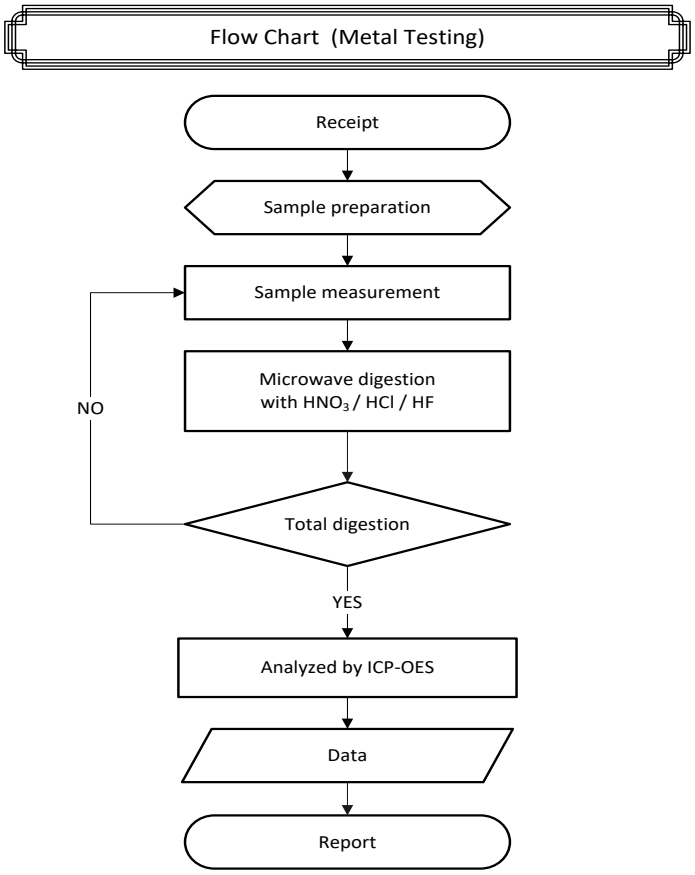
Flow Chart (EN14582)



TEST REPORT

REPORT NO. RT21R-S5014-003-E-RA DATE: Aug. 17, 2021

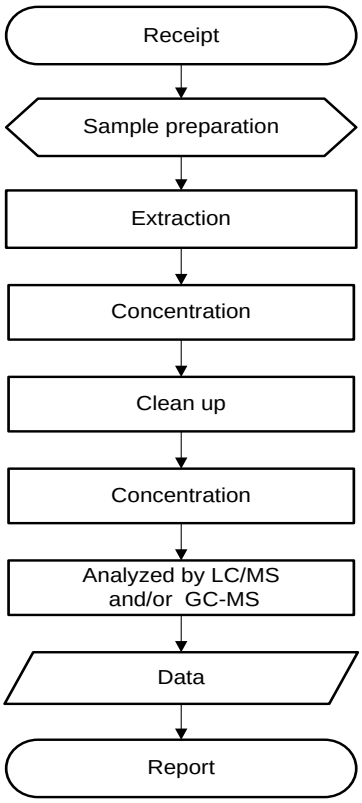
SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder



** Remarks : The samples were dissolved totally by pre-conditioning method according to above flow chart.

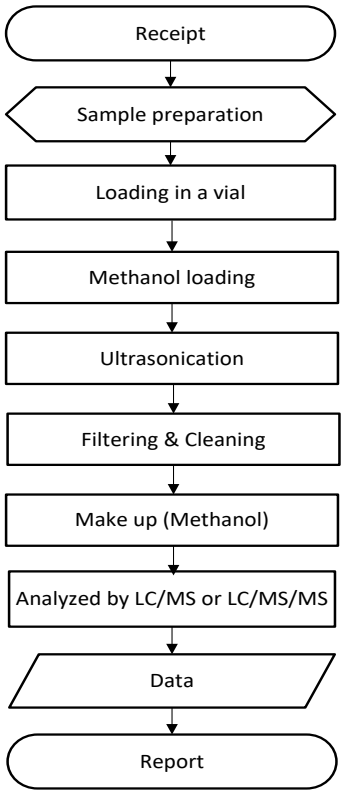
SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder

Flow Chart (HBCDD)



SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder

Flow Chart (PFOS, PFOA)

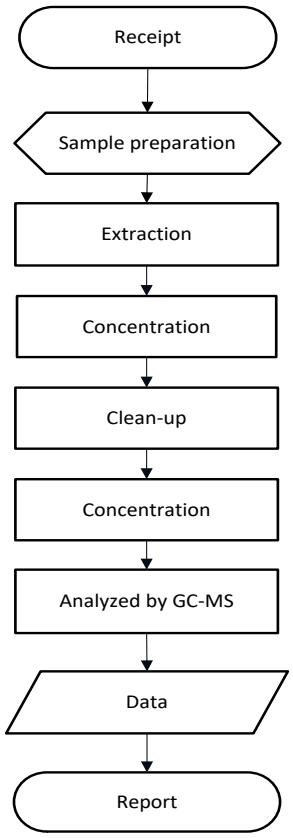


TEST REPORT

REPORT NO. RT21R-S5014-003-E-RA DATE: Aug. 17, 2021

SAMPLE ID NO. : RT21R-S5014-003
SAMPLE DESCRIPTION : Ceramic powder

Flow Chart (Phthalates)



***** End of Report *****

Intertek Testing Services Korea Ltd.
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CTI 华测检测

Test Report

Report No. A2210294315101002 Page 1 of 12

Company Name shown on Report	AMPLE ELECTRONIC TECHNOLOGY CO., LTD
Address	NO.32, DAYOU 3RD ST., DALIAO DIST., KAOHSIUNG CITY 83163, TAIWAN

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

Sample Name	Metallic conductor paste
Part No.	PR2060、PR2070、 PR2130、PR2230、PR2132、PR2135、PR2138、PR2140、PR2150、PR2153、PR2275、PR2300、PR2367、PR2400、PR2500、PR2505、PR2565、PR2700、PR2703、PR2750、PR2755、PR2767、PR2820、PR2868、PR2982、PR2995PR20158、PR7064、PR7050、PR7070、PR22360、PR22470、PR22520、PR22580、PR22680、PR22690、PR22700、PR22741、PR22742、PR22743、PR22760、22741、22603、PT8070、RU01、RU02、RU03、RU04、RU05、RU06、RU07、RU08、RU09、RU10、IP3802、IP4155、IP1460、IP4165、IP4170、IP4175、IP4180
Sample Received Date	Jul. 26, 2021
Testing Period	Jul. 26, 2021 to Aug. 06, 2021
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), Beryllium (Be), Antimony (Sb), Arsenic(As), Selenium(Se), Hexabromocyclododecane (HBCDD), Chlorine (Cl), Bromine (Br), Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA), Phthalates, Polychlorinated Naphthalenes (PCNs), Poly Chloride Triphenyls (PCTs), Polychlorinated Biphenyls(PCBs) , Red phosphorus in the submitted sample(s).
Test Method/Test Result(s)	Please refer to the following page(s).

Tested by Morgan Reviewed by Ben. Huang

Approved by George Fong Date Aug. 06, 2021

George Fong
Laboratory Manager

No. R392331952

Test Report

Test Method

Tested Item(s)	Test Method	Measured Equipment(s)
Lead(Pb)	IEC 62321-5:2013	ICP-OES
Cadmium(Cd)	IEC 62321-5:2013	ICP-OES
Mercury(Hg)	IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES
Hexavalent Chromium(Cr(VI))	IEC 62321-7-2:2017	UV-Vis
Polybrominated Biphenyls(PBBs)	IEC 62321-6:2015	GC-MS
Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS
Phthalates	IEC 62321-8:2017	GC-MS
Beryllium (Be)	Refer to US EPA 3052:1996 & US EPA 6010D:2014	ICP-OES
Antimony (Sb)	Refer to US EPA 3052:1996 & US EPA 6010D:2014	ICP-OES
Arsenic(As)	Refer to US EPA 3052:1996 & US EPA 6010D:2014	ICP-OES
Selenium(Se)	Refer to US EPA 3052:1996 & US EPA 6010D:2014	ICP-OES
Hexabromocyclododecane (HBCDD)	IEC 62321-6:2015	GC-MS
Chlorine (Cl)	Refer to EN 14582:2016	IC
Bromine (Br)	Refer to EN 14582:2016	IC
Perfluorooctane Sulfonates (PFOS)	Refer to CEN/TS 15968:2010	LC-MS-MS
Perfluorooctanoic Acid (PFOA)	Refer to CEN/TS 15968:2010	LC-MS-MS
Polychlorinated Naphthalenes (PCNs)	Refer to US EPA 3550C:2007 & US EPA 8270E:2018	GC-MS
Poly Chloride Triphenyls (PCTs)	Refer to US EPA 3550C:2007 & US EPA 8270E:2018	GC-MS
Polychlorinated Biphenyls(PCBs)	Refer to US EPA 3550C:2007 & US EPA 8270E:2018	GC-MS
Red phosphorus	Refer to GB/T 9722-2006	PY-GC-MS

Test Report

Test Result(s)

Tested Item(s)	Result	MDL
Lead (Pb)	N.D.	2 mg/kg
Cadmium (Cd)	N.D.	2 mg/kg
Mercury (Hg)	N.D.	2 mg/kg
Hexavalent Chromium (Cr(VI))	N.D.	8 mg/kg

Tested Item(s)	Result	MDL
Polybrominated Biphenyls(PBBs)		
Monobromodiphenyl	N.D.	5 mg/kg
Dibromobiphenyl	N.D.	5 mg/kg
Tribromobiphenyl	N.D.	5 mg/kg
Tetrabromobiphenyl	N.D.	5 mg/kg
Pentabromobiphenyl	N.D.	5 mg/kg
Hexabromobiphenyl	N.D.	5 mg/kg
Heptabromobiphenyl	N.D.	5 mg/kg
Octabromobiphenyl	N.D.	5 mg/kg
Nonabromobiphenyl	N.D.	5 mg/kg
Decabromobiphenyl	N.D.	5 mg/kg

Tested Item(s)	Result	MDL
Polybrominated Diphenyl Ethers(PBDEs)		
Monobromodiphenyl ether	N.D.	5 mg/kg
Dibromobiphenyl ether	N.D.	5 mg/kg
Tribromobiphenyl ether	N.D.	5 mg/kg
Tetrabromobiphenyl ether	N.D.	5 mg/kg
Pentabromobiphenyl ether	N.D.	5 mg/kg
Hexabromobiphenyl ether	N.D.	5 mg/kg
Heptabromobiphenyl ether	N.D.	5 mg/kg
Octabromobiphenyl ether	N.D.	5 mg/kg
Nonabromobiphenyl ether	N.D.	5 mg/kg
Decabromobiphenyl ether	N.D.	5 mg/kg

Test Report

Tested Item(s)	Result	MDL
Phthalates		
Dibutyl phthalate(DBP) CAS#:84-74-2	N.D.	50 mg/kg
Benzylbutyl phthalate(BBP) CAS#:85-68-7	N.D.	50 mg/kg
Di-2-ethylhexyl phthalate(DEHP) CAS#:117-81-7	N.D.	50 mg/kg
Diisobutyl phthalate(DIBP) CAS#:84-69-5	N.D.	50 mg/kg

Tested Item(s)	Result	MDL
Beryllium (Be)	N.D.	10 mg/kg
Antimony (Sb)	N.D.	10 mg/kg
Arsenic (As)	N.D.	10 mg/kg
Selenium(Se)	N.D.	5 mg/kg
Hexabromocyclododecane(HBCDD)	N.D.	5 mg/kg
Perfluorooctane Sulfonates (PFOS)	N.D.	0.01 mg/kg
Perfluorooctanoic Acid (PFOA)	N.D.	0.01 mg/kg

Tested Item(s)	Result	MDL
Chlorine (Cl)	N.D.	50 mg/kg
Bromine (Br)	N.D.	50 mg/kg

Tested Item(s)	Result	MDL
Phthalates		
Diisononyl phthalate(DINP) CAS#:28553-12-0,68515-48-0	N.D.	50 mg/kg
Di-n-hexyl phthalate(DNHP) CAS#:84-75-3	N.D.	50 mg/kg
Diisodecyl phthalate(DIDP) CAS#:26761-40-0,68515-49-1	N.D.	50 mg/kg
Di-n-octyl phthalate(DNOP) CAS#:117-84-0	N.D.	50 mg/kg
Dipentyl phthalate(DPP) CAS#:131-18-0	N.D.	50 mg/kg
Bis(2-methoxyethyl) phthalate (DMEP)# CAS#:117-82-8	N.D.	50 mg/kg
①1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP) # CAS#:71888-89-6	N.D.	50 mg/kg
①1,2-Benzenedicarboxylic acid, di-(C7-11)-branched and linear alkyl esters (DHNUP) # CAS#:68515-42-4	N.D.	50 mg/kg

Test Report

Tested Item(s)	Result	MDL
Polychlorinated Naphthalenes (PCNs) #	N.D.	5 mg/kg
Poly Chloride Triphenyls (PCTs)#	N.D.	5 mg/kg
Polychlorinated Biphenyls (PCBs) #	N.D.	5 mg/kg

Tested Item(s)	Result	MDL
Red phosphorus#	Negative*	500 mg/kg

Sample/Part Description Silvery solid Gray thin

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

-MDL = Method Detection Limit

-N.D. = Not Detected (<MDL)

-mg/kg = ppm = parts per million

-Negative = Not Contained

-The red phosphorus is qualified by PY-GC-MS method which detect pyrolysis products P_4 of red phosphorus. But there is a false positive risk by performing this method, since P_4 could also generate while the phosphate and organic phosphate coexist with some strong oxidizing or reductant agent in pyrolysis process.

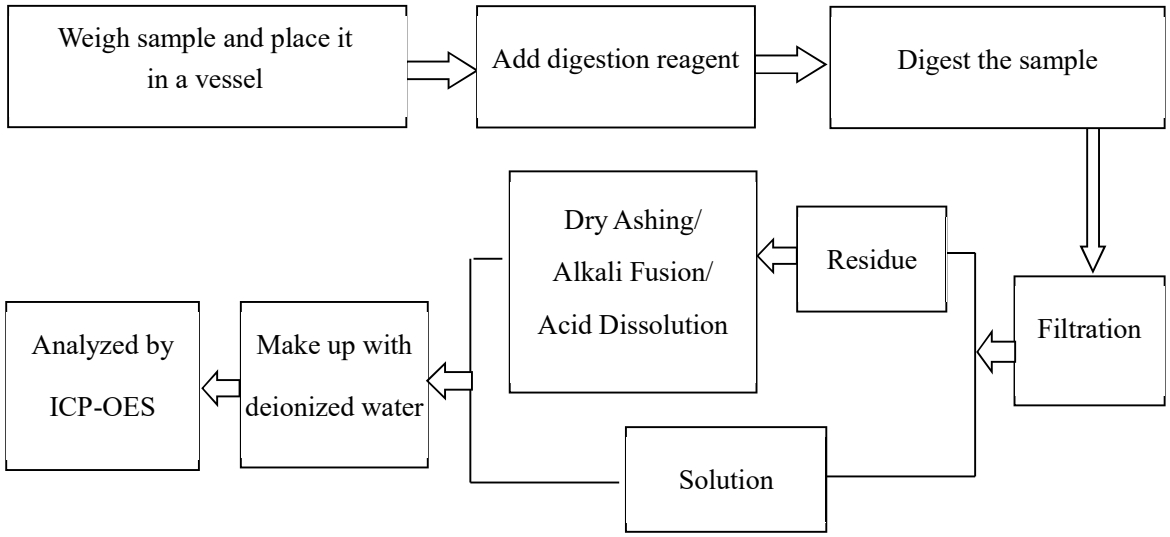
-*Result for reference only.

-①: In view of the substances are established as UVCB substances (substances of unknown or variable composition, complex reaction products or biological materials) consisting of different and variable constituents, the test results are calculated based on the main constituents of the representative compounds for substances.

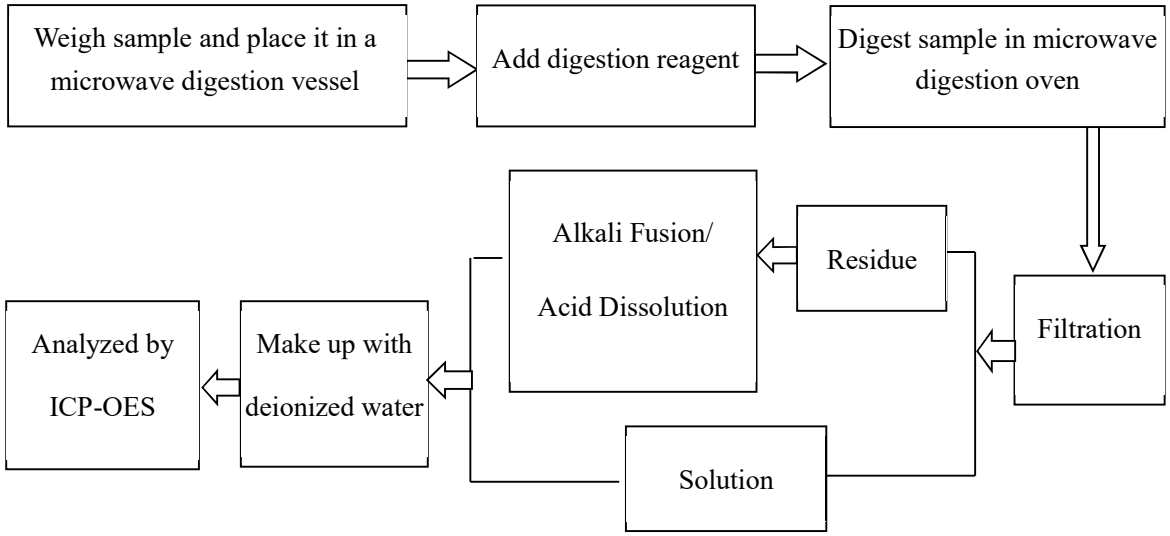
Note: " # " indicates the testing item(s) was (were) fulfilled by Centre Testing International Group Co.,Ltd.

Test Process

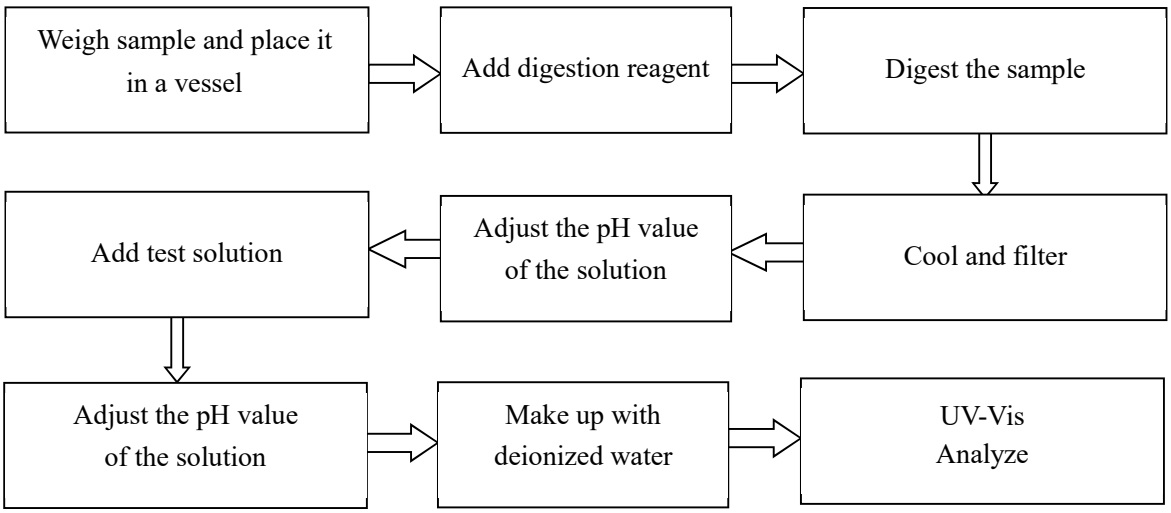
1. Lead(Pb), Cadmium(Cd)



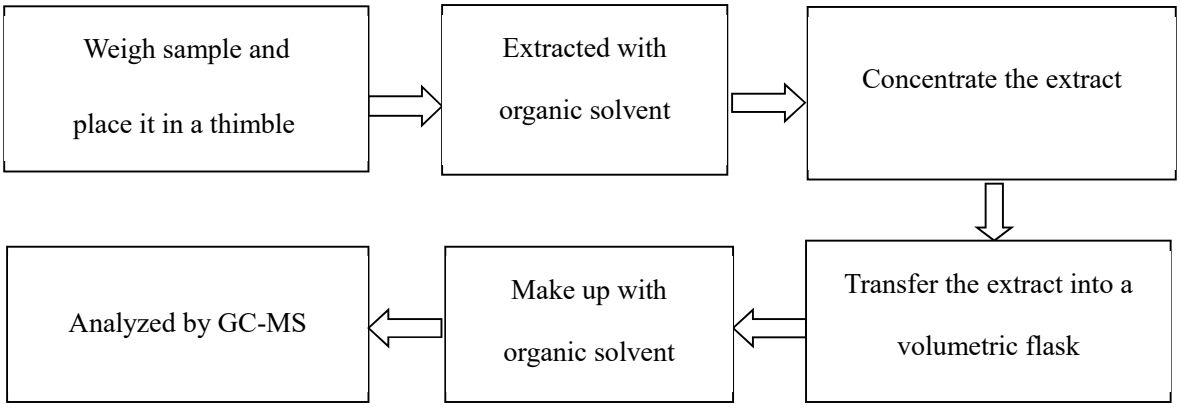
2. Mercury(Hg)



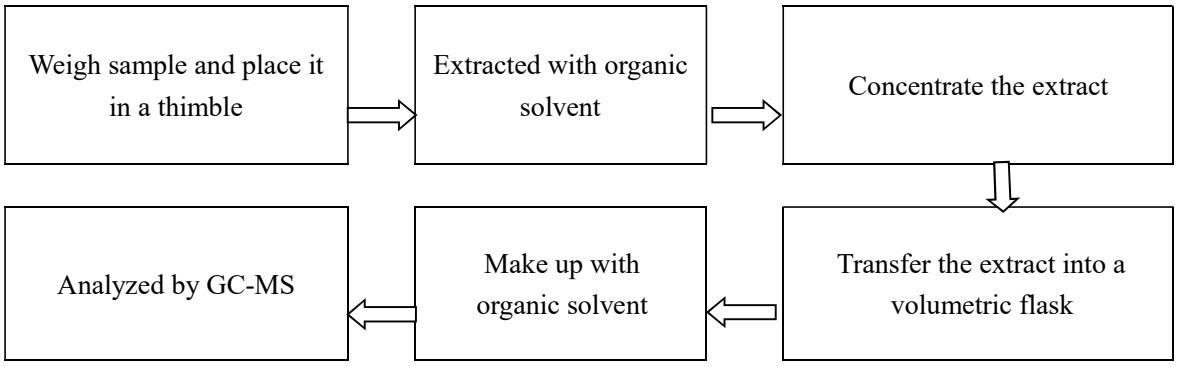
3. Hexavalent Chromium(Cr(VI))



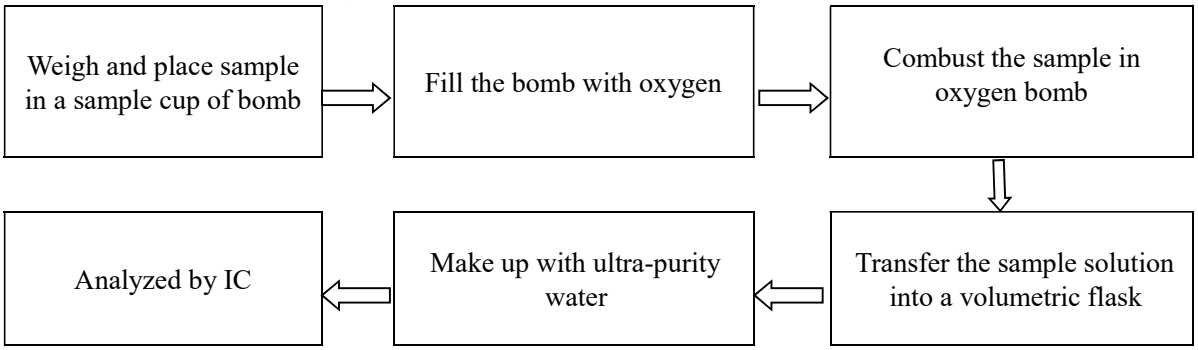
4.Polybrominated Diphenyl Ethers (PBDEs), Polybrominated Biphenyls(PBBs)



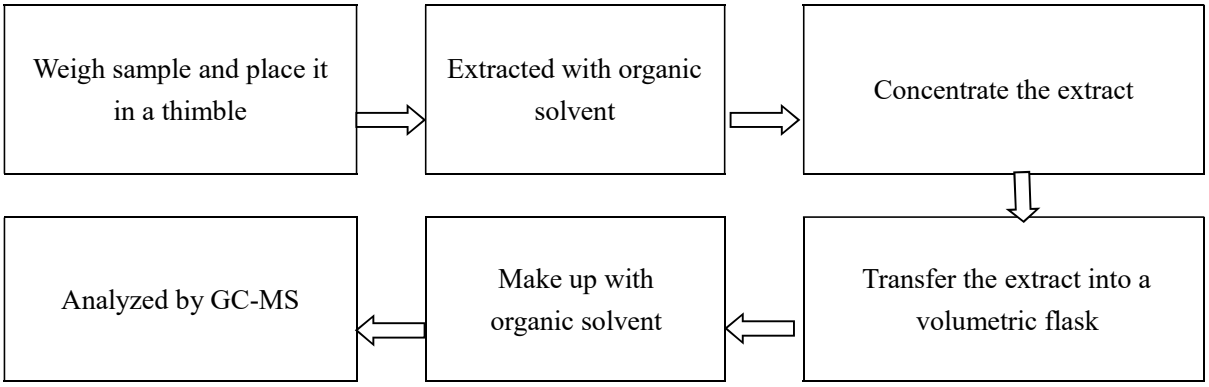
5. Phthalates



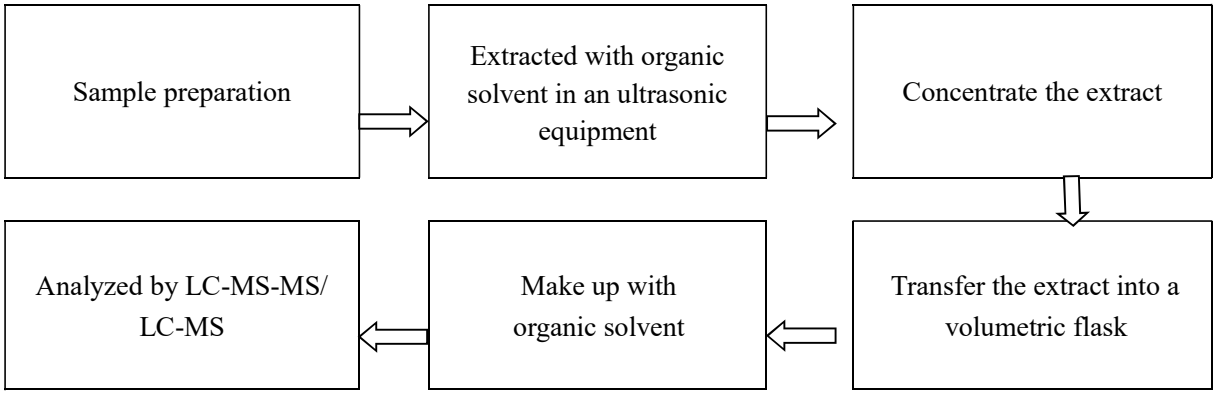
6. Chlorine (Cl), Bromine (Br)



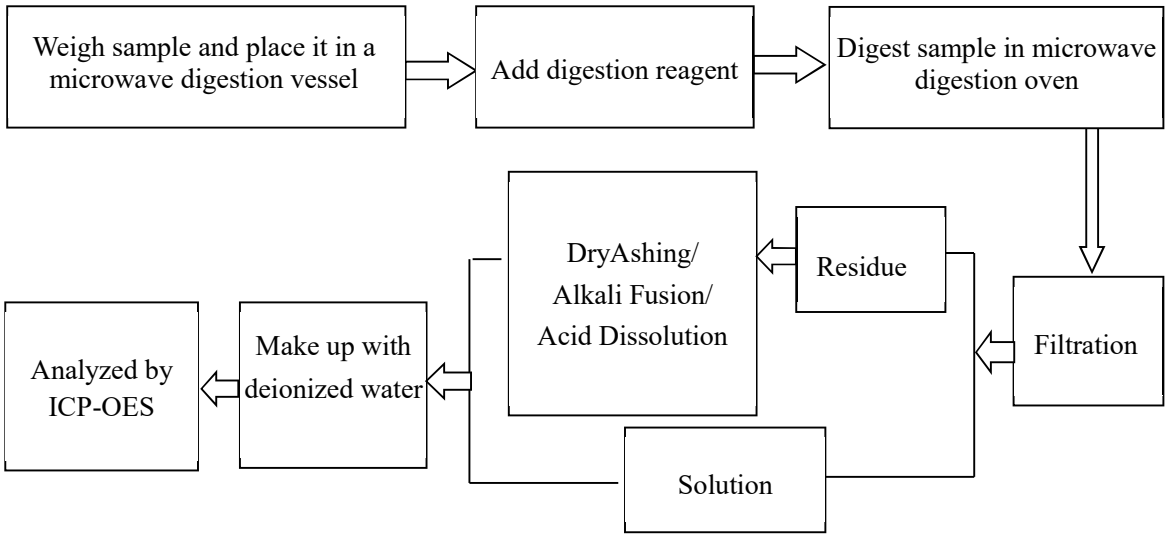
7. Hexabromocyclododecane (HBCDD)



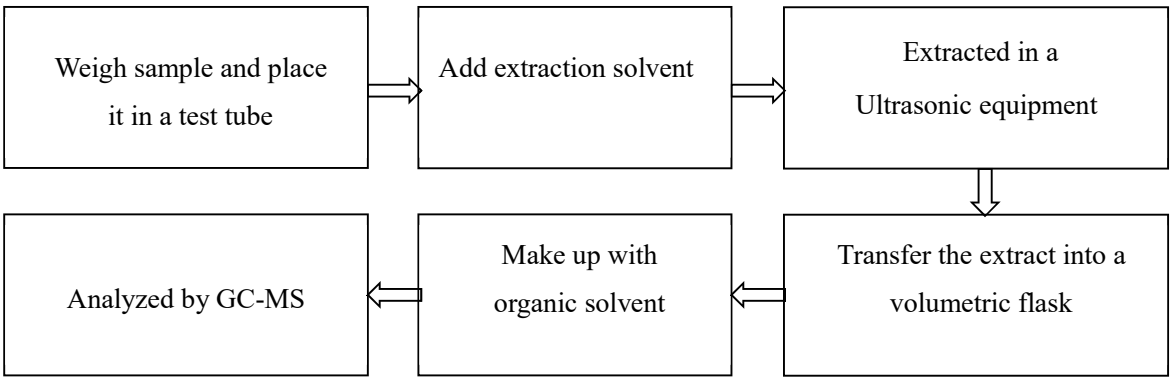
8. Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA)



9. Beryllium (Be), Antimony (Sb), Arsenic(As), Selenium(Se)

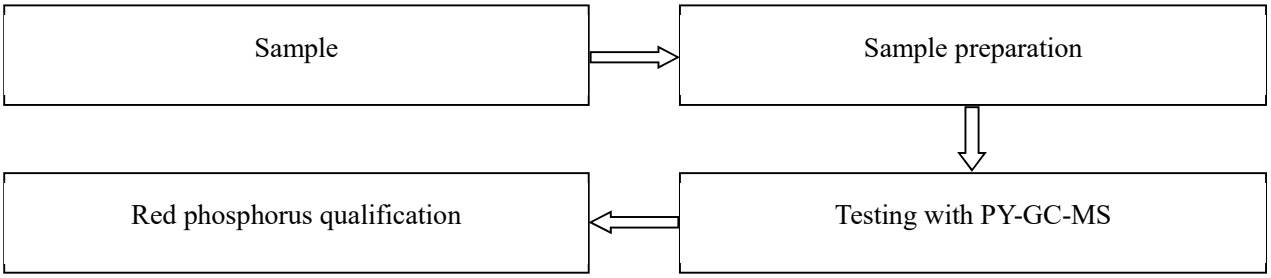


10. Polychlorinated Biphenyls (PCBs), Polychlorinated Triphenyls(PCTs), Polychlorinated Naphthalene(PCNs)

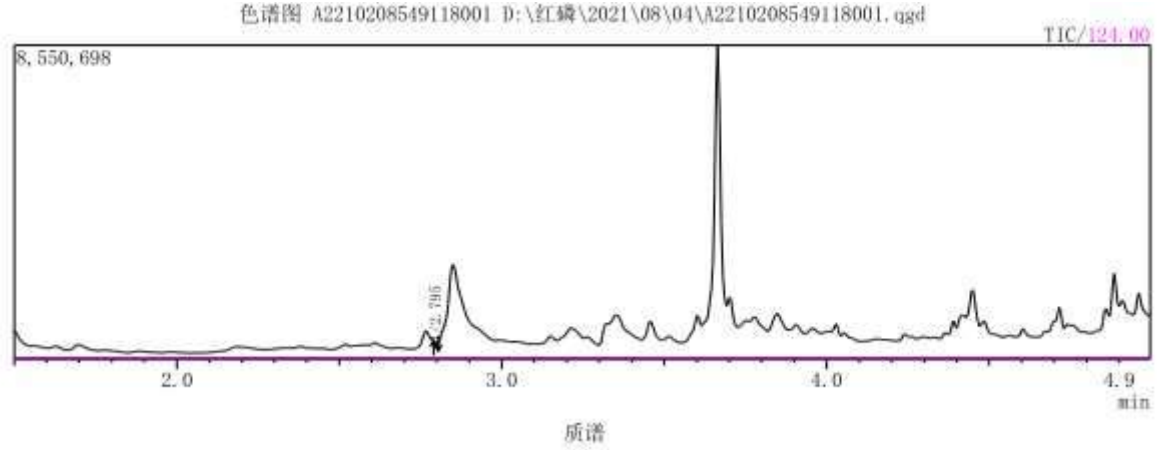


Test Report

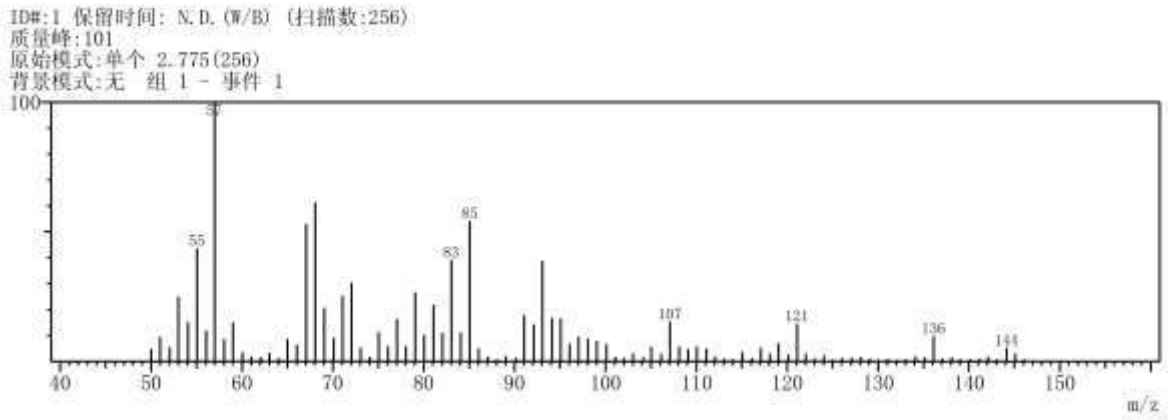
11. Red phosphorus



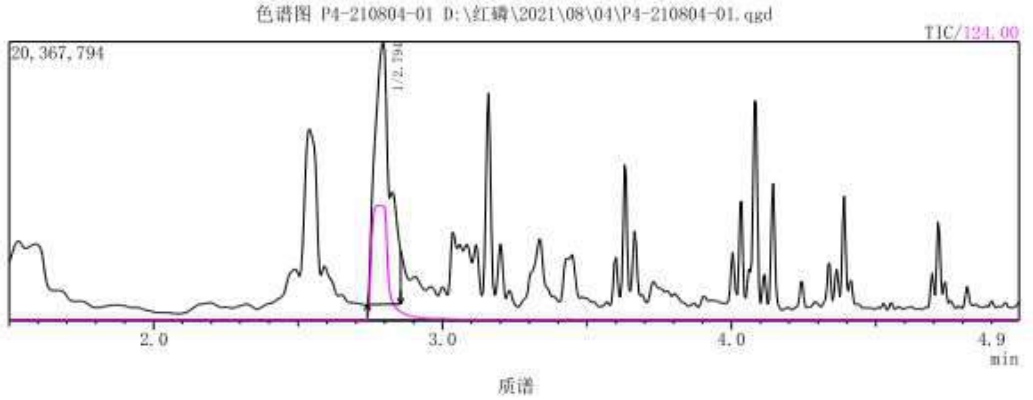
Red phosphorus Sample Test Spectra

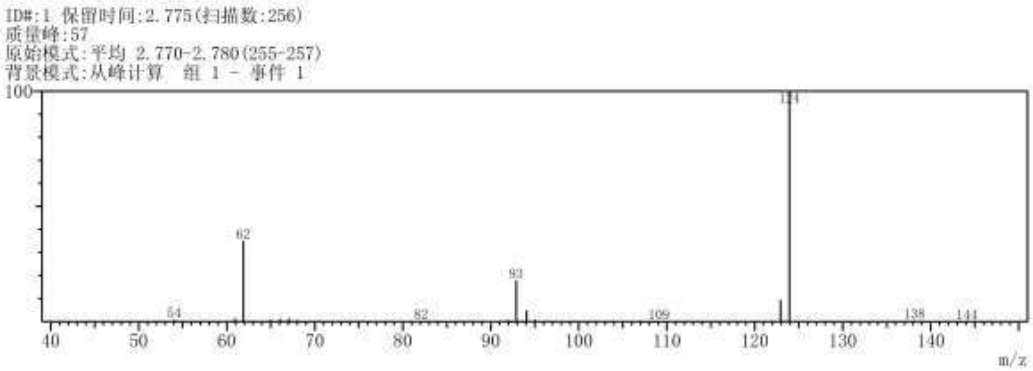


质谱



Standard Material Test Spectra





Test Report

Photo(s) of the sample(s)

Statement：

1. This report is considered invalidated without approval signature, special seal and the seal on the perforation;
2. Company Name and Address shown on Report, the sample(s) and sample information was/were provided by the client who should be responsible for the authenticity which CTI hasn't verified;
3. The result(s) shown in this report refer(s) only to the sample(s) tested;
4. Without written approval of CTI, this report can't be reproduced except in full;
5. In case of any discrepancy between the English version and Chinese version of the testing reports (if generated), the Chinese version shall prevail.

*** End of Report ***

測試報告
Test Report

號碼(No.): ETR21A01682　　日期(Date): 18-Oct-2021　　

詠業科技股份有限公司 (UNICTRON TECHNOLOGIES CORPORATION)
桃園市龍潭區渴望路83號5樓 (NO.83, KEWANG RD., LONGTAN DIST., TAOYUAN CITY 32565, TAIWAN (R.O.C.))

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as)：

送樣廠商(Sample Submitted By)	:	詠業科技股份有限公司 (UNICTRON TECHNOLOGIES CORPORATION)
樣品名稱(Sample Name)	:	SILVER PASTE
樣品型號(Style/Item No.)	:	K3352F

==========

收件日(Sample Receiving Date)	:	12-Oct-2021
測試期間(Testing Period)	:	12-Oct-2021 to 18-Oct-2021

測試需求(Test Requested) :　依據客戶指定，參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP。 (As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).)

測試結果(Test Results) :　請參閱下一頁 (Please refer to following pages.)

結　論(Conclusion) :　根據客戶所提供的樣品，其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU) 2015/863之限值要求。 (Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.)

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

CHECK REPORT
PIN CODE: 73D4EC2A

測試報告
Test Report

詠業科技股份有限公司 (UNICTRON TECHNOLOGIES CORPORATION)
桃園市龍潭區渴望路83號5樓 (NO.83, KEWANG RD., LONGTAN DIST., TAOYUAN CITY 32565, TAIWAN (R.O.C.))

測試部位敘述 (Test Part Description)

No.1 : 銀灰色膏狀 (SILVER-GRAY PASTE)

測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)	限值 (Limit)
				No.1	
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	參考IEC 62321-5: 2013，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	100
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439-92-1)		mg/kg	2	n.d.	1000
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	參考IEC 62321-4: 2013+ AMD1: 2017，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	1000
六價鉻 Cr(VI) (Hexavalent Chromium Cr(VI)) (CAS No.: 18540-29-9)	參考IEC 62321-7-2: 2017，以紫外光-可見光分光光度計分析。(With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.)	mg/kg	8	n.d.	1000
一溴聯苯 (Monobromobiphenyl)	參考IEC 62321-6: 2015，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.)	mg/kg	5	n.d.	-
二溴聯苯 (Dibromobiphenyl)		mg/kg	5	n.d.	-
三溴聯苯 (Tribromobiphenyl)		mg/kg	5	n.d.	-
四溴聯苯 (Tetrabromobiphenyl)		mg/kg	5	n.d.	-
五溴聯苯 (Pentabromobiphenyl)		mg/kg	5	n.d.	-
六溴聯苯 (Hexabromobiphenyl)		mg/kg	5	n.d.	-
七溴聯苯 (Heptabromobiphenyl)		mg/kg	5	n.d.	-
八溴聯苯 (Octabromobiphenyl)		mg/kg	5	n.d.	-
九溴聯苯 (Nonabromobiphenyl)		mg/kg	5	n.d.	-
十溴聯苯 (Decabromobiphenyl)		mg/kg	5	n.d.	-
多溴聯苯總和 (Sum of PBBs)		mg/kg	-	n.d.	1000

詠業科技股份有限公司 (UNICTRON TECHNOLOGIES CORPORATION)
桃園市龍潭區渴望路83號5樓 (NO.83, KEWANG RD., LONGTAN DIST., TAOYUAN CITY 32565, TAIWAN (R.O.C.))

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result) No.1	限值 (Limit)
一溴聯苯醚 (Monobromodiphenyl ether)	參考IEC 62321-6: 2015，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.)	mg/kg	5	n.d.	-
二溴聯苯醚 (Dibromodiphenyl ether)		mg/kg	5	n.d.	-
三溴聯苯醚 (Tribromodiphenyl ether)		mg/kg	5	n.d.	-
四溴聯苯醚 (Tetrabromodiphenyl ether)		mg/kg	5	n.d.	-
五溴聯苯醚 (Pentabromodiphenyl ether)		mg/kg	5	n.d.	-
六溴聯苯醚 (Hexabromodiphenyl ether)		mg/kg	5	n.d.	-
七溴聯苯醚 (Heptabromodiphenyl ether)		mg/kg	5	n.d.	-
八溴聯苯醚 (Octabromodiphenyl ether)		mg/kg	5	n.d.	-
九溴聯苯醚 (Nonabromodiphenyl ether)		mg/kg	5	n.d.	-
十溴聯苯醚 (Decabromodiphenyl ether)		mg/kg	5	n.d.	-
多溴聯苯醚總和 (Sum of PBDEs)		mg/kg	-	n.d.	1000
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl benzyl phthalate (BBP)) (CAS No.: 85-68-7)	參考IEC 62321-8: 2017，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.)	mg/kg	50	n.d.	1000
鄰苯二甲酸二丁酯 (DBP) (Dibutyl phthalate (DBP)) (CAS No.: 84-74-2)		mg/kg	50	n.d.	1000
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP)) (CAS No.: 84-69-5)		mg/kg	50	n.d.	1000
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-(2-ethylhexyl) phthalate (DEHP)) (CAS No.: 117-81-7)		mg/kg	50	n.d.	1000

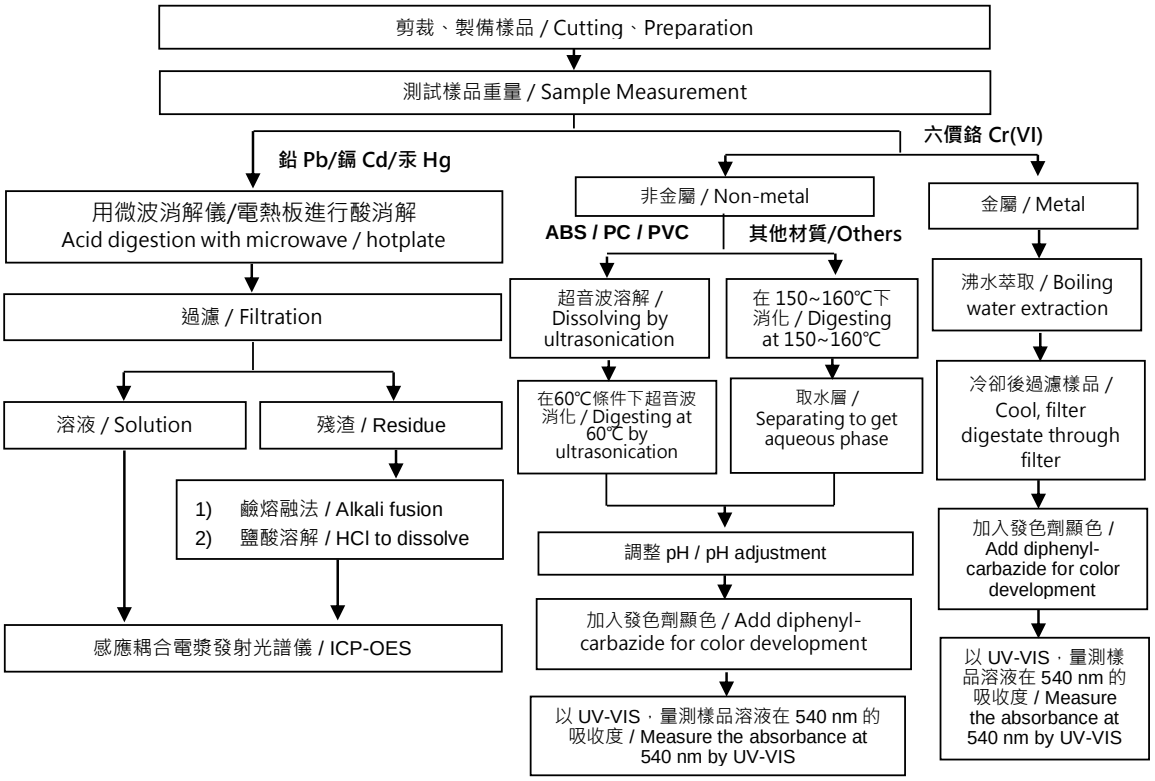
備註(Note)：

1. mg/kg = ppm；0.1wt% = 1000ppm
2. MDL = Method Detection Limit (方法偵測極限值)
3. n.d. = Not Detected (未檢出)；小於MDL / Less than MDL
4. "-" = Not Regulated (無規格值)
5. 符合性結果之判定係以測試結果與限值做比較。(The statement of compliance conformity is based on comparison of testing results and limits.)

詠業科技股份有限公司 (UNICTRON TECHNOLOGIES CORPORATION)
桃園市龍潭區渴望路83號5樓 (NO.83, KEWANG RD., LONGTAN DIST., TAOYUAN CITY 32565, TAIWAN (R.O.C.))

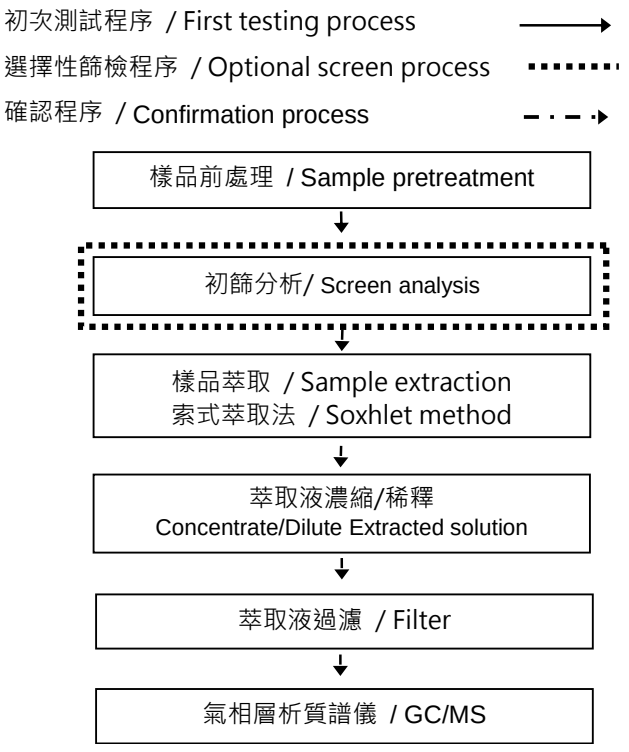
重金屬流程圖 / Analytical flow chart of Heavy Metal

根據以下的流程圖之條件，樣品已完全溶解。（六價鉻測試方法除外）
These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)



詠業科技股份有限公司 (UNICTRON TECHNOLOGIES CORPORATION)
桃園市龍潭區渴望路83號5樓 (NO.83, KEWANG RD., LONGTAN DIST., TAOYUAN CITY 32565, TAIWAN (R.O.C.))

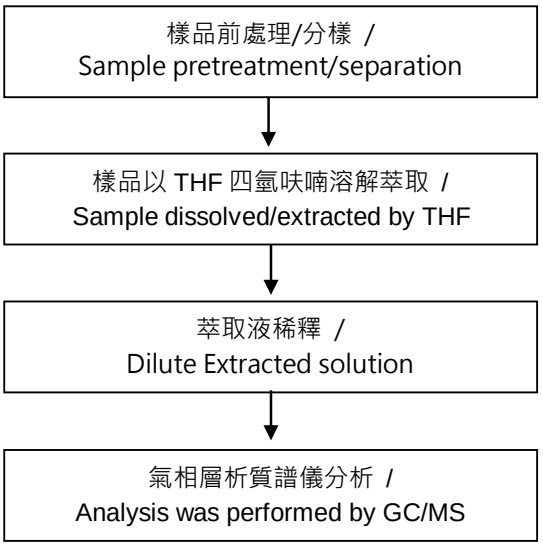
多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBBs/PBDEs



詠業科技股份有限公司 (UNICTRON TECHNOLOGIES CORPORATION)
桃園市龍潭區渴望路83號5樓 (NO.83, KEWANG RD., LONGTAN DIST., TAOYUAN CITY 32565, TAIWAN (R.O.C.))

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

【測試方法/Test method: IEC 62321-8】



詠業科技股份有限公司 (UNICTRON TECHNOLOGIES CORPORATION)
桃園市龍潭區渴望路83號5樓 (NO.83, KEWANG RD., LONGTAN DIST., TAOYUAN CITY 32565, TAIWAN (R.O.C.))

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

ETR21A01682

ETR21A01682

** 報告結尾 (End of Report) **

Test Report

No.: ETR21602247 Date: 22-Jun-2021

DAIKEN CHEMICAL SALES & MFG. CO., LTD.
2-7-19, HANATEN NISHI, JOTO-KU, OSAKA, 536-0011, JAPAN

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

Sample Submitted By	:	DAIKEN CHEMICAL SALES & MFG. CO., LTD.
Sample Name	:	Ag PASTE
Style/Item No.	:	K3352F
Buyer/Order No.	:	210610-22

==========

Sample Receiving Date	:	15-Jun-2021
Testing Period	:	15-Jun-2021 to 21-Jun-2021

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

CHECK REPORT
PIN CODE: 3C769894

DAIKEN CHEMICAL SALES & MFG. CO., LTD.
2-7-19, HANATEN NISHI, JOTO-KU, OSAKA, 536-0011, JAPAN

Test Part Description

No.1 : GRAY PASTE

Test Result(s)

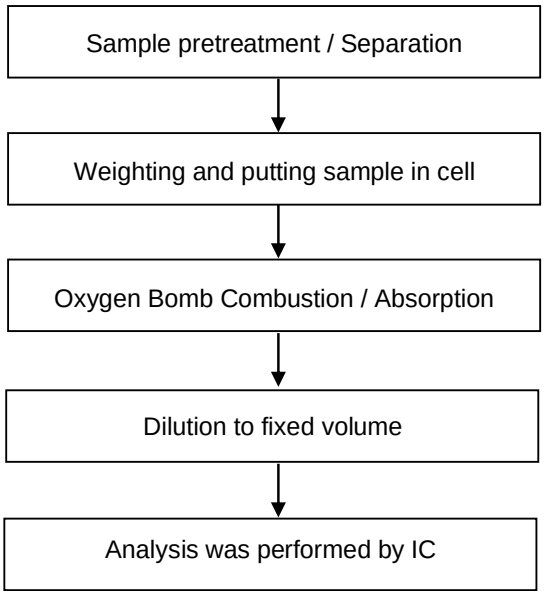
Test Item(s)	Method	Unit	MDL	Result
				No.1
Fluorine (F) (CAS No.: 14762-94-8)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.
Chlorine (Cl) (CAS No.: 22537-15-1)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.
Bromine (Br) (CAS No.: 10097-32-2)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.
Iodine (I) (CAS No.: 14362-44-8)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.
Beryllium (Be) (CAS No.: 7440-41-7)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	n.d.
Antimony (Sb) (CAS No.: 7440-36-0)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	n.d.

Note：

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected (Less than MDL)

DAIKEN CHEMICAL SALES & MFG. CO., LTD.
2-7-19, HANATEN NISHI, JOTO-KU, OSAKA, 536-0011, JAPAN

Analytical flow chart - Halogen

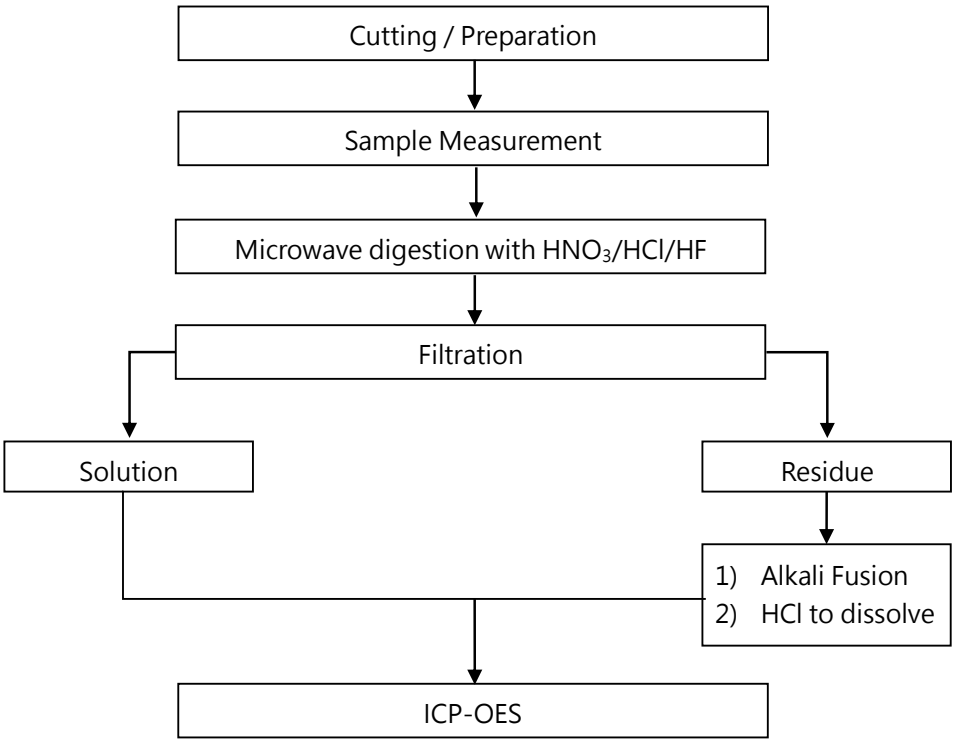


DAIKEN CHEMICAL SALES & MFG. CO., LTD.
2-7-19, HANATEN NISHI, JOTO-KU, OSAKA, 536-0011, JAPAN

Analytical flow chart of Heavy Metal

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

【Reference method：US EPA 3051A、US EPA 3052】

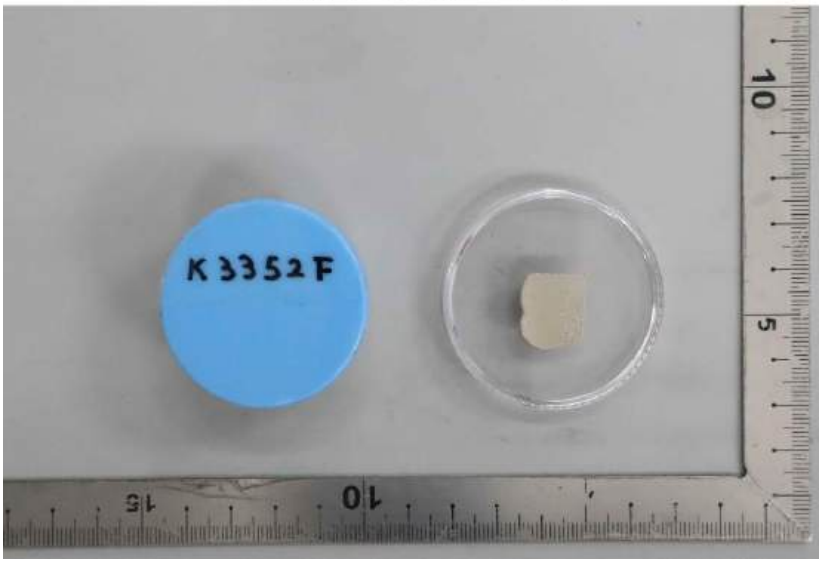


* US EPA 3051A method does not add HF.

DAIKEN CHEMICAL SALES & MFG. CO., LTD.
2-7-19, HANATEN NISHI, JOTO-KU, OSAKA, 536-0011, JAPAN

*** The tested sample / part is marked by an arrow if it's shown on the photo. ***

ETR21602247



** End of Report **

測試報告

Test Report

號碼(No.): ETR21501532 日期(Date): 18-May-2021

台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as)：

送樣廠商(Sample Submitted By) : 台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
樣品名稱(Sample Name) : DP4303W

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收件日(Sample Receiving Date) : 07-May-2021
測試期間(Testing Period) : 07-May-2021 to 18-May-2021

測試需求(Test Requested) :
(1) 依據客戶指定，參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP。 (As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).)
(2) 其他測試項目請見下一頁。 (Please refer to next pages for the other item(s).)

測試結果(Test Results) : 請參閱下一頁 (Please refer to following pages.)

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

CHECK REPORT
PIN CODE: A47DCB25

測試報告
Test Report

台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

測試部位敘述 (Test Part Description)

No.1 : 暗綠色膏狀 (DARK GREEN PASTE)

測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)
				No.1
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	參考IEC 62321-5: 2013，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439-92-1)	參考IEC 62321-5: 2013，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	參考IEC 62321-4: 2013+ AMD1: 2017，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
六價鉻 Cr(VI) (Hexavalent Chromium Cr(VI)) (CAS No.: 18540-29-9)	參考IEC 62321-7-2: 2017，以紫外光-可見光分光光度計分析。(With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.)	mg/kg	8	n.d.
一溴聯苯 (Monobromobiphenyl)	參考IEC 62321-6: 2015，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.)	mg/kg	5	n.d.
二溴聯苯 (Dibromobiphenyl)		mg/kg	5	n.d.
三溴聯苯 (Tribromobiphenyl)		mg/kg	5	n.d.
四溴聯苯 (Tetrabromobiphenyl)		mg/kg	5	n.d.
五溴聯苯 (Pentabromobiphenyl)		mg/kg	5	n.d.
六溴聯苯 (Hexabromobiphenyl)		mg/kg	5	n.d.
七溴聯苯 (Heptabromobiphenyl)		mg/kg	5	n.d.
八溴聯苯 (Octabromobiphenyl)		mg/kg	5	n.d.
九溴聯苯 (Nonabromobiphenyl)		mg/kg	5	n.d.
十溴聯苯 (Decabromobiphenyl)		mg/kg	5	n.d.
多溴聯苯總和 (Sum of PBBs)		mg/kg	-	n.d.

測試報告

Test Report

台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)
				No.1
一溴聯苯醚 (Monobromodiphenyl ether)	參考IEC 62321-6: 2015，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.)	mg/kg	5	n.d.
二溴聯苯醚 (Dibromodiphenyl ether)		mg/kg	5	n.d.
三溴聯苯醚 (Tribromodiphenyl ether)		mg/kg	5	n.d.
四溴聯苯醚 (Tetrabromodiphenyl ether)		mg/kg	5	n.d.
五溴聯苯醚 (Pentabromodiphenyl ether)		mg/kg	5	n.d.
六溴聯苯醚 (Hexabromodiphenyl ether)		mg/kg	5	n.d.
七溴聯苯醚 (Heptabromodiphenyl ether)		mg/kg	5	n.d.
八溴聯苯醚 (Octabromodiphenyl ether)		mg/kg	5	n.d.
九溴聯苯醚 (Nonabromodiphenyl ether)		mg/kg	5	n.d.
十溴聯苯醚 (Decabromodiphenyl ether)		mg/kg	5	n.d.
多溴聯苯醚總和 (Sum of PBDEs)		mg/kg	-	n.d.
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl benzyl phthalate (BBP)) (CAS No.: 85-68-7)	參考IEC 62321-8: 2017，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.)	mg/kg	50	n.d.
鄰苯二甲酸二丁酯 (DBP) (Dibutyl phthalate (DBP)) (CAS No.: 84-74-2)		mg/kg	50	n.d.
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-(2-ethylhexyl) phthalate (DEHP)) (CAS No.: 117-81-7)		mg/kg	50	n.d.
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP)) (CAS No.: 84-69-5)		mg/kg	50	n.d.
鄰苯二甲酸二異癸酯 (DIDP) (Diisodecyl phthalate (DIDP)) (CAS No.: 26761-40-0, 68515-49-1)		mg/kg	50	n.d.
鄰苯二甲酸二異壬酯 (DINP) (Diisononyl phthalate (DINP)) (CAS No.: 28553-12-0, 68515-48-0)		mg/kg	50	n.d.
鄰苯二甲酸二正戊酯 (DNPP) (Di-n-pentyl phthalate (DNPP)) (CAS No.: 131-18-0)		mg/kg	50	n.d.
鄰苯二甲酸二正己酯 (DNHP) (Di-n-hexyl phthalate (DNHP)) (CAS No.: 84-75-3)		mg/kg	50	n.d.

測試報告
Test Report

台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result) No.1
六溴環十二烷及所有主要被辨別出的異構物(HBCDD) (α- HBCDD, β- HBCDD, γ- HBCDD) (Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD)) (CAS No.: 25637-99-4, 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))	參考IEC 62321: 2008，以氣相層析儀/質譜儀分析。(With reference to IEC 62321: 2008, analysis was performed by GC/MS.)	mg/kg	5	n.d.
氟 (F) (Fluorine (F)) (CAS No.: 14762-94-8)	參考BS EN 14582: 2016，以離子層析儀分析。(With reference to BS EN 14582: 2016, analysis was performed by IC.)	mg/kg	50	n.d.
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-15-1)		mg/kg	50	n.d.
溴 (Br) (Bromine (Br)) (CAS No.: 10097-32-2)		mg/kg	50	n.d.
碘 (I) (Iodine (I)) (CAS No.: 14362-44-8)		mg/kg	50	n.d.
銻 (Sb) (Antimony (Sb)) (CAS No.: 7440-36-0)	參考US EPA 3052: 1996，以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)	參考US EPA 3050B: 1996，以感應耦合電漿發射光譜儀分析。(With reference to US EPA 3050B: 1996, analysis was performed by ICP-OES.)	mg/kg	2	n.d.

備註(Note)：

1. mg/kg = ppm；0.1wt% = 1000ppm
2. MDL = Method Detection Limit (方法偵測極限值)
3. n.d. = Not Detected (未檢出)；小於MDL / Less than MDL
4. "-" = Not Regulated (無規格值)
5. 氟、氯、溴、碘：丙酮萃取前處理。
   Fluorine, Chlorine、Bromine, Iodine : Pretreatment by acetone extraction.

台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
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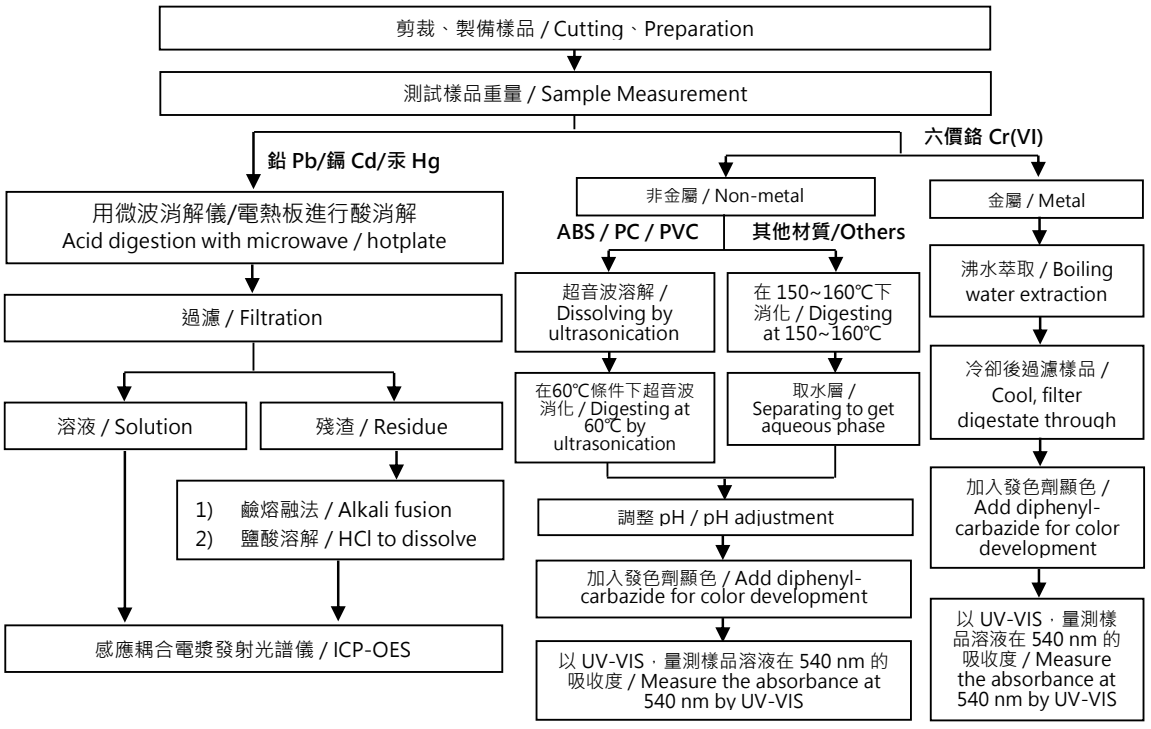
重金屬流程圖 / Analytical flow chart of Heavy Metal

根據以下的流程圖之條件，樣品已完全溶解。（六價鉻測試方法除外）

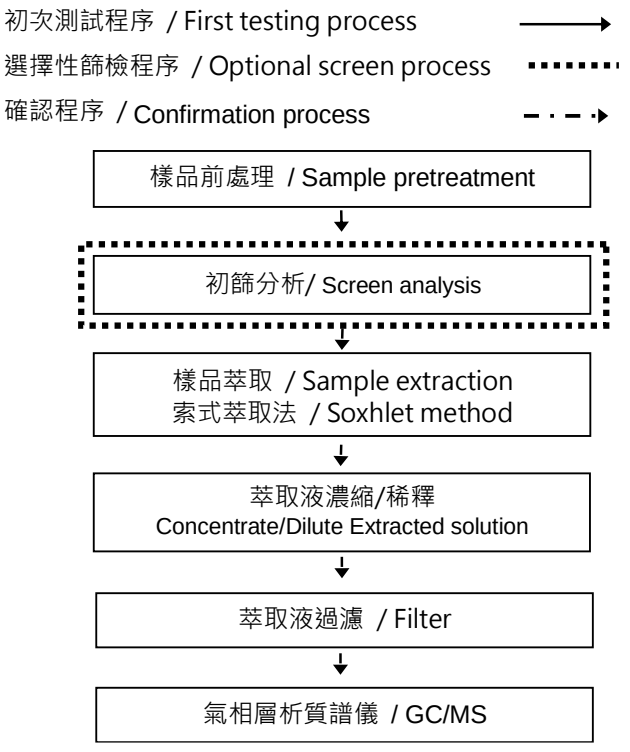
These samples were dissolved totally by pre-conditioning method according to below flow chart.

（Cr^{6+} test method excluded）



台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

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



台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
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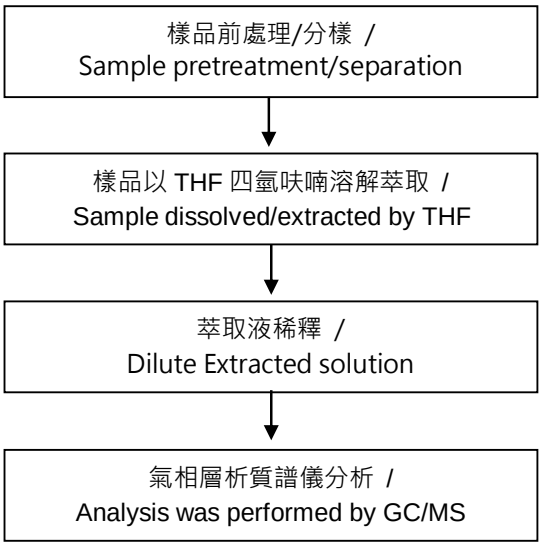
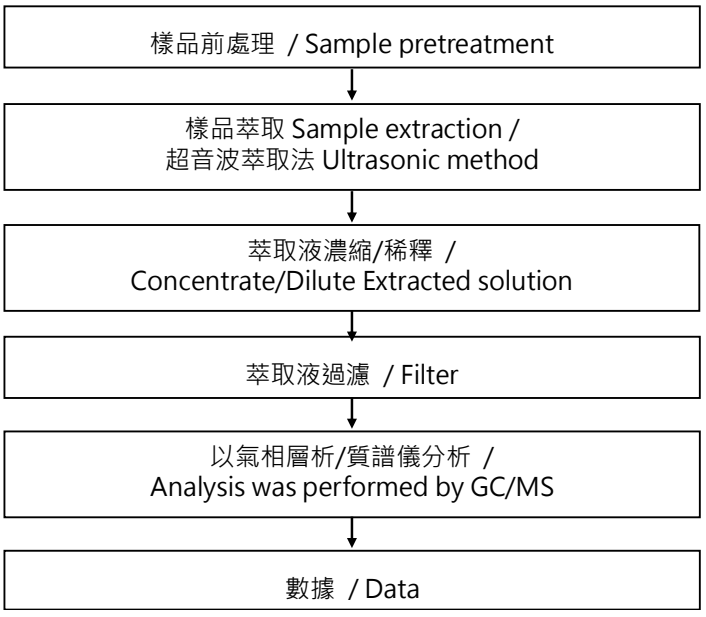
可塑劑分析流程圖 / Analytical flow chart - Phthalate

【測試方法/Test method: IEC 62321-8】



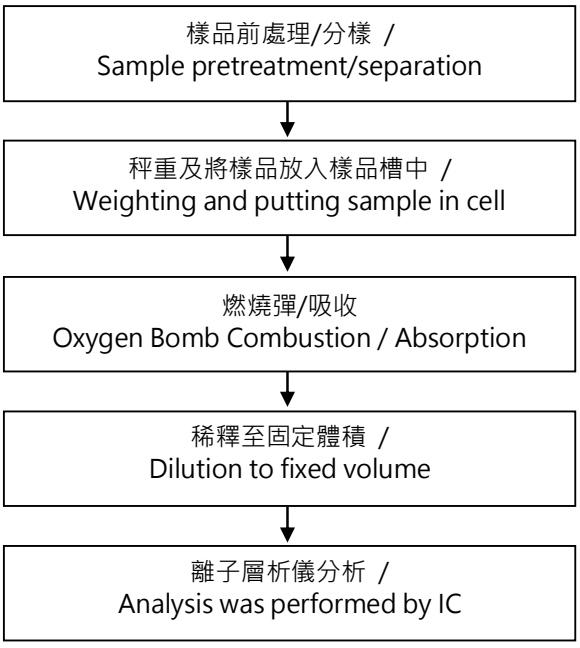
台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

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



台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

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



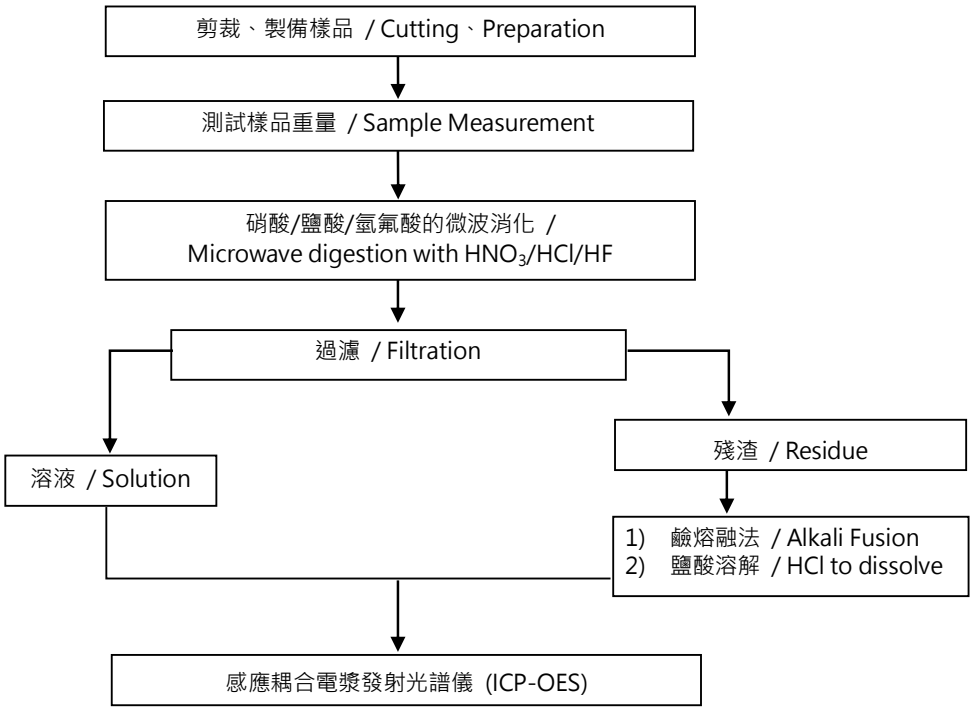
台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

重金屬流程圖 / Analytical flow chart of Heavy Metal

根據以下的流程圖之條件，樣品已完全溶解。

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

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



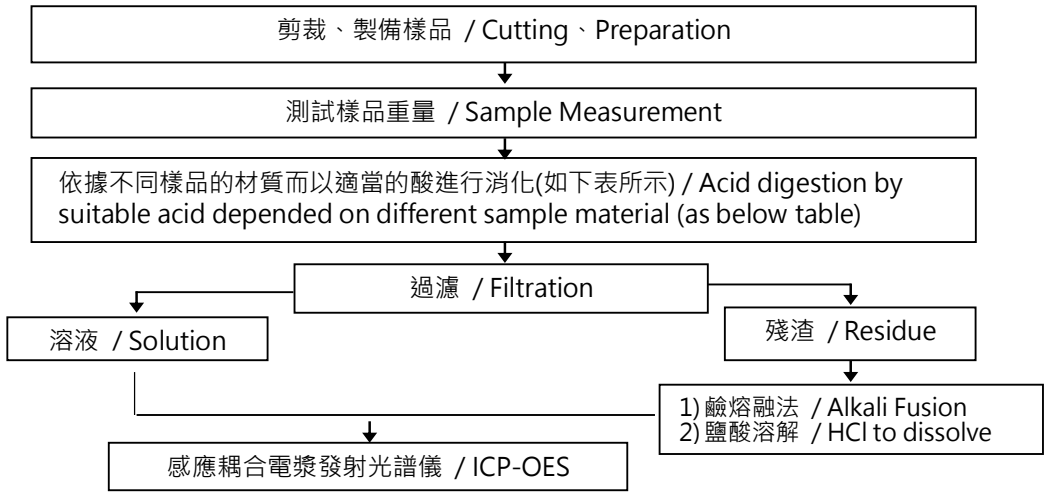
* US EPA 3051A 方法未添加氫氟酸 / US EPA 3051A method does not add HF.

台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

元素以 ICP-OES 分析的消化流程圖

(Flow Chart of digestion for the elements analysis performed by ICP-OES)

根據以下的流程圖之條件，樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.



鋼,銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氟酸,雙氧水 / Aqua regia, HNO_3, HCl, HF, H_2O_2
玻璃 / Glass	硝酸,氫氟酸 / HNO_3/HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO_3
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / H_2SO_4, H_2O_2, HNO_3, HCl
其他 / Others	加入適當的試劑至完全溶解 / Added appropriate reagent to total digestion

測試報告
Test Report

台灣納美仕股份有限公司 (NAMICS TAIWAN CO., LTD.)
苗栗縣銅鑼鄉銅科一路3號 (NO. 3, TONGKE 1ST RD ., TONGLUO TOWNSHIP, MIAOLI COUNTY 36645, TAIWAN (R.O.C))

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

ETR21501532

** 報告結尾 (End of Report) **

測試報告
Test Report

號碼(No.): ETR21805612 日期(Date): 03-Sep-2021

久尹股份有限公司 (JOYIN CO., LTD.)
桃園市楊梅區牡牡路623巷160號 (NO. 160, LN. 623, SHENSHEN RD., YANGMEI DIST., TAOYUAN CITY 32651, TAIWAN)

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as)：

送樣廠商(Sample Submitted By)	:	久尹股份有限公司 (JOYIN CO., LTD.)
樣品名稱(Sample Name)	:	GLASS PASTE
樣品型號(Style/Item No.)	:	JG7 SERIES

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收件日(Sample Receiving Date)	:	26-Aug-2021
測試期間(Testing Period)	:	26-Aug-2021 to 03-Sep-2021

測試需求(Test Requested) :

(1) 依據客戶指定，參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP。(As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).)

(2) 依據客戶指定，測試鹵素-氟、氯、溴、碘。 (As specified by client, to test Halogen-Fluorine, Chlorine, Bromine, Iodine in the submitted sample.)

測試結果(Test Results) : 請參閱下一頁 (Please refer to following pages.)

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

CHECK REPORT
PIN CODE: A46A14B8

測試報告
Test Report

久尹股份有限公司 (JOYIN CO., LTD.)
桃園市楊梅區牡牡路623巷160號 (NO. 160, LN. 623, SHENSHEN RD., YANGMEI DIST., TAOYUAN CITY 32651, TAIWAN)

測試部位敘述 (Test Part Description)

No.1 : 黑色膏狀 (BLACK PASTE)

測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)
				No.1
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	參考IEC 62321-5: 2013，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439-92-1)		mg/kg	2	5.09
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	參考IEC 62321-4: 2013+ AMD1: 2017，以感應耦合電漿發射光譜儀分析。(With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.)	mg/kg	2	n.d.
六價鉻 Cr(VI) (Hexavalent Chromium Cr(VI)) (CAS No.: 18540-29-9)	參考IEC 62321-7-2: 2017，以紫外光-可見光分光光度計分析。(With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.)	mg/kg	8	n.d.
一溴聯苯 (Monobromobiphenyl)	參考IEC 62321-6: 2015，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.)	mg/kg	5	n.d.
二溴聯苯 (Dibromobiphenyl)		mg/kg	5	n.d.
三溴聯苯 (Tribromobiphenyl)		mg/kg	5	n.d.
四溴聯苯 (Tetrabromobiphenyl)		mg/kg	5	n.d.
五溴聯苯 (Pentabromobiphenyl)		mg/kg	5	n.d.
六溴聯苯 (Hexabromobiphenyl)		mg/kg	5	n.d.
七溴聯苯 (Heptabromobiphenyl)		mg/kg	5	n.d.
八溴聯苯 (Octabromobiphenyl)		mg/kg	5	n.d.
九溴聯苯 (Nonabromobiphenyl)		mg/kg	5	n.d.
十溴聯苯 (Decabromobiphenyl)		mg/kg	5	n.d.
多溴聯苯總和 (Sum of PBBs)		mg/kg	-	n.d.

久尹股份有限公司 (JOYIN CO., LTD.)
桃園市楊梅區牡牡路623巷160號 (NO. 160, LN. 623, SHENSHEN RD., YANGMEI DIST., TAOYUAN CITY 32651, TAIWAN)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)
				No.1
一溴聯苯醚 (Monobromodiphenyl ether)	參考IEC 62321-6: 2015，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.)	mg/kg	5	n.d.
二溴聯苯醚 (Dibromodiphenyl ether)		mg/kg	5	n.d.
三溴聯苯醚 (Tribromodiphenyl ether)		mg/kg	5	n.d.
四溴聯苯醚 (Tetrabromodiphenyl ether)		mg/kg	5	n.d.
五溴聯苯醚 (Pentabromodiphenyl ether)		mg/kg	5	n.d.
六溴聯苯醚 (Hexabromodiphenyl ether)		mg/kg	5	n.d.
七溴聯苯醚 (Heptabromodiphenyl ether)		mg/kg	5	n.d.
八溴聯苯醚 (Octabromodiphenyl ether)		mg/kg	5	n.d.
九溴聯苯醚 (Nonabromodiphenyl ether)		mg/kg	5	n.d.
十溴聯苯醚 (Decabromodiphenyl ether)		mg/kg	5	n.d.
多溴聯苯醚總和 (Sum of PBDEs)		mg/kg	-	n.d.
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl benzyl phthalate (BBP)) (CAS No.: 85-68-7)	參考IEC 62321-8: 2017，以氣相層析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.)	mg/kg	50	n.d.
鄰苯二甲酸二丁酯 (DBP) (Dibutyl phthalate (DBP)) (CAS No.: 84-74-2)		mg/kg	50	n.d.
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP)) (CAS No.: 84-69-5)		mg/kg	50	n.d.
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-(2-ethylhexyl) phthalate (DEHP)) (CAS No.: 117-81-7)		mg/kg	50	n.d.
氟 (F) (Fluorine (F)) (CAS No.: 14762-94-8)	參考BS EN 14582: 2016，以離子層析儀分析。(With reference to BS EN 14582: 2016, analysis was performed by IC.)	mg/kg	50	n.d.
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-15-1)		mg/kg	50	n.d.
溴 (Br) (Bromine (Br)) (CAS No.: 10097-32-2)		mg/kg	50	n.d.
碘 (I) (Iodine (I)) (CAS No.: 14362-44-8)		mg/kg	50	n.d.

久尹股份有限公司 (JOYIN CO., LTD.)
桃園市楊梅區牡牡路623巷160號 (NO. 160, LN. 623, SHENSHEN RD., YANGMEI DIST., TAOYUAN CITY 32651, TAIWAN)

備註(Note)：

1. mg/kg = ppm；0.1wt% = 1000ppm
2. MDL = Method Detection Limit (方法偵測極限值)
3. n.d. = Not Detected (未檢出) ; 小於MDL / Less than MDL
4. "-" = Not Regulated (無規格值)

久尹股份有限公司 (JOYIN CO., LTD.)
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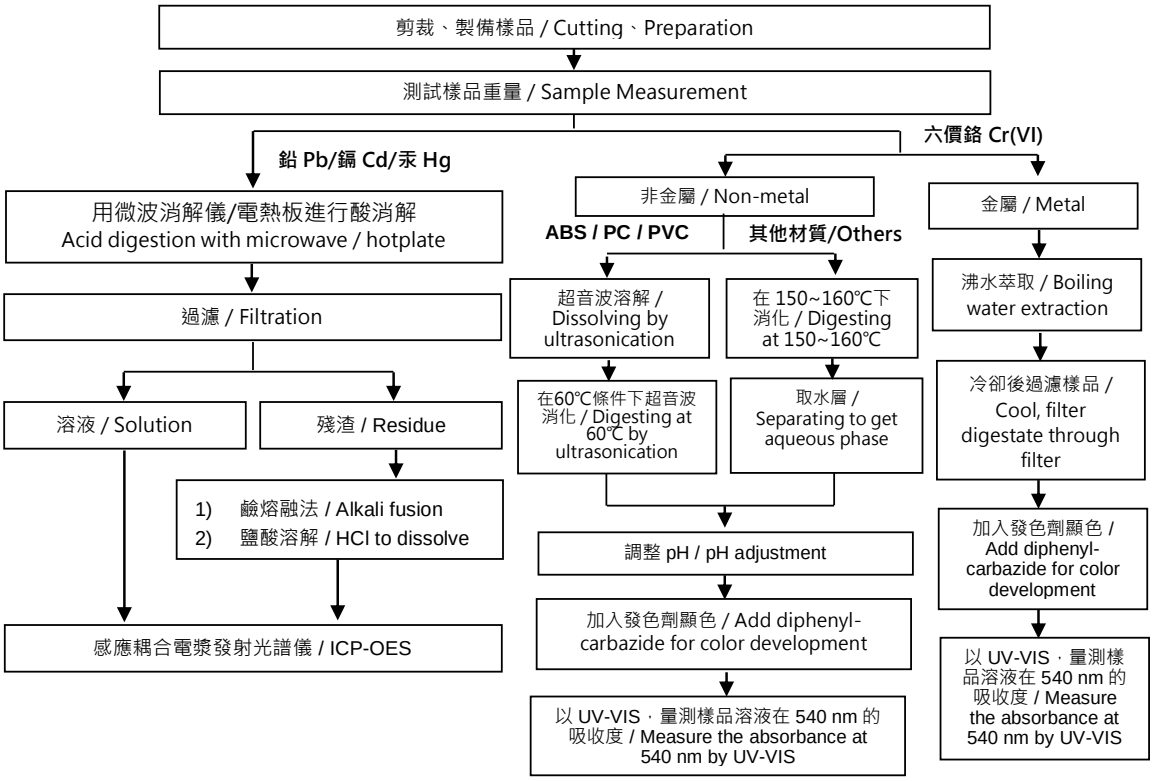
重金屬流程圖 / Analytical flow chart of Heavy Metal

根據以下的流程圖之條件，樣品已完全溶解。（六價鉻測試方法除外）
These samples were dissolved totally by pre-conditioning method according to below flow chart.（Cr^{6+} test method excluded）



久尹股份有限公司 (JOYIN CO., LTD.)
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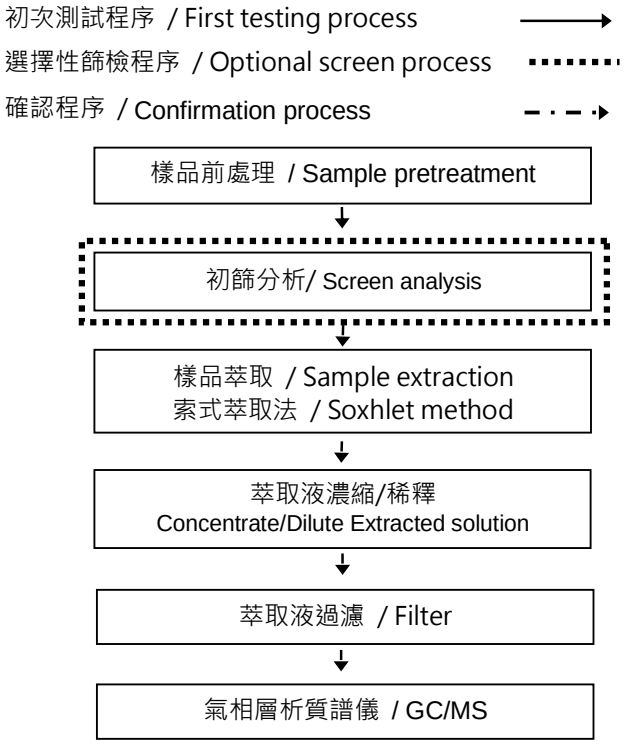
多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBBs/PBDEs



久尹股份有限公司 (JOYIN CO., LTD.)
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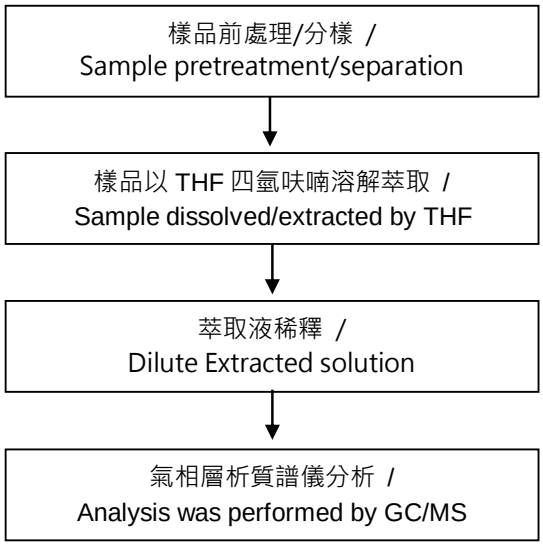
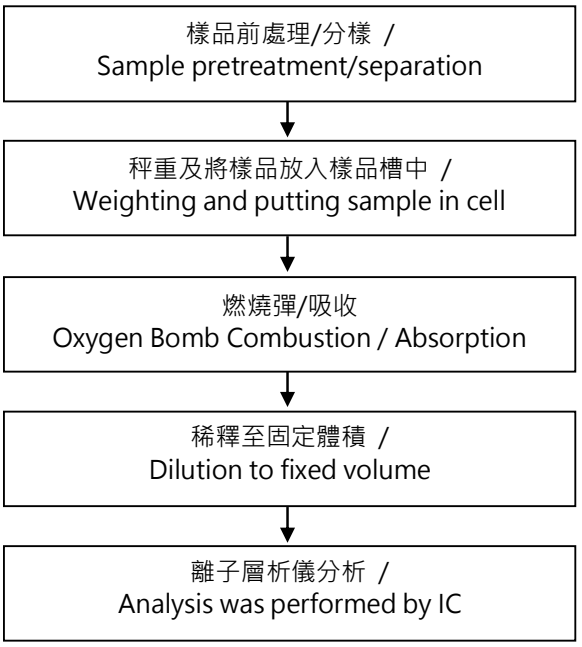
可塑劑分析流程圖 / Analytical flow chart - Phthalate

【測試方法/Test method: IEC 62321-8】



久尹股份有限公司 (JOYIN CO., LTD.)
桃園市楊梅區牡牡路623巷160號 (NO. 160, LN. 623, SHENSHEN RD., YANGMEI DIST., TAOYUAN CITY 32651, TAIWAN)

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



測試報告
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久尹股份有限公司 (JOYIN CO., LTD.)
桃園市楊梅區牡牡路623巷160號 (NO. 160, LN. 623, SHENSHEN RD., YANGMEI DIST., TAOYUAN CITY 32651, TAIWAN)

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

ETR21805612

** 報告結尾 (End of Report) **

檢測報告
Test Report

報告編號 A2200452711101001E
Report No. A2200452711101001E

報告抬頭公司名稱
Company Name shown on Report
研澤科技股份有限公司
R‧BRIGHT TECHNOLOGY CO., LTD.

地 址
Address
338 桃園市蘆竹區中興一街61巷5號
NO.5, LN. 61, ZHONGXING 1ST ST., LUZHU DIST., TAOYUAN CITY 338, TAIWAN (R.O.C.)

以下測試之樣品及樣品資訊由申請者提供並確認
The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant

樣品名稱 Sample Name	胺基磺酸鎳185g/L NICKEL SULFAMATE 185g/L
樣品接收日期 Sample Received Date	2020.12.14 Dec. 14, 2020
樣品檢測日期 Testing Period	2020.12.14‧2020.12.18 Dec. 14, 2020 to Dec. 18, 2020
檢測要求	根據客戶要求，對所提交樣品中的鉛(Pb)，鎘(Cd)，汞(Hg)，六價鉻(Cr(VI))，多溴聯苯(PBBs)，多溴二苯醚(PBDEs)，鄰苯二甲酸酯(DBP, BBP, DEHP, DIBP)，氟(F)，氯(Cl)，溴(Br)，碘(I)進行測試。
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), Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I) in the submitted sample(s).
檢測依據/檢測結果 **Test Method/Test Result(s)**	請參見下頁。 Please refer to the following page(s).

主 檢
Tested by 徐浩瑞

批 准
Approved by 馮智聰

馮智聰
實驗室經理 Laboratory Manager

審 核
Reviewed by 黃文昕

日 期
Date 2020.12.18

No. R307381724

台灣華測檢測技術有限公司檢測中心
Testing Center, Centre Testing International (Taiwan) Co., Ltd.
桃園市蘆竹區南崁路二段9號5樓之6
5F‧6, No.9, Sec.2, Nankan Rd, Luzhu Dist., Taoyuan, Taiwan

檢測報告
Test Report

檢測依據 Test Method

測試項目 Test Item(s)	測試方法 Test Method	測試儀器 Measured Equipment(s)
鉛 Lead (Pb)	IEC 62321‑5:2013	ICP‑OES
鎘 Cadmium (Cd)	IEC 62321‑5:2013	ICP‑OES
汞 Mercury (Hg)	IEC 62321‑4:2013+AMD1:2017 CSV	ICP‑OES
六價鉻 Hexavalent Chromium (Cr(VI))	IEC 62321‑7‑2:2017	UV‑vis
多溴聯苯 Polybrominated Biphenyls (PBBs)	IEC 62321‑6:2015	GC‑MS
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321‑6:2015	GC‑MS
鄰苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)	IEC 62321‑8:2017	GC‑MS
氟 Fluorine (F)	參考EN 14582:2016 Refer to EN 14582:2016	IC
氯 Chlorine (Cl)	參考EN 14582:2016 Refer to EN 14582:2016	IC
溴 Bromine (Br)	參考EN 14582:2016 Refer to EN 14582:2016	IC
碘 Iodine (I)	參考EN 14582:2016 Refer to EN 14582:2016	IC

檢測報告
Test Report

檢測結果 Test Result(s)

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
鉛 Lead (Pb)	N.D.	2 mg/kg
鎘 Cadmium (Cd)	N.D.	2 mg/kg
汞 Mercury (Hg)	N.D.	2 mg/kg
六價鉻 Hexavalent Chromium (Cr(VI))	N.D.	8 mg/kg

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
多溴聯苯 Polybrominated Biphenyls (PBBs)		
PBBs PBBs (PBBs)	N.D.	/
一溴聯苯 Monobromobiphenyl	N.D.	5 mg/kg
二溴聯苯 Dibromobiphenyl	N.D.	5 mg/kg
三溴聯苯 Tribromobiphenyl	N.D.	5 mg/kg
四溴聯苯 Tetrabromobiphenyl	N.D.	5 mg/kg
五溴聯苯 Pentabromobiphenyl	N.D.	5 mg/kg
六溴聯苯 Hexabromobiphenyl	N.D.	5 mg/kg
七溴聯苯 Heptabromobiphenyl	N.D.	5 mg/kg
八溴聯苯 Octabromobiphenyl	N.D.	5 mg/kg
九溴聯苯 Nonabromobiphenyl	N.D.	5 mg/kg
十溴聯苯 Decabromobiphenyl	N.D.	5 mg/kg

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)		
PBDEs PBDEs (PBDEs)	N.D.	/
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

檢測報告
Test Report

檢測結果 Test Result(s)

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
鄰苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)		
鄰苯二甲酸丁基苄基酯 Butyl benzyl phthalate (BBP) CAS#:85‑68‑7	N.D.	50 mg/kg
鄰苯二甲酸二(2‑乙基)己酯 Di‑(2‑ethylhexyl) phthalate (DEHP) CAS#:117‑81‑7	N.D.	50 mg/kg
鄰苯二甲酸二丁酯 Dibutyl phthalate (DBP) CAS#:84‑74‑2	N.D.	50 mg/kg
鄰苯二甲酸二異丁酯 Diisobutyl phthalate (DIBP) CAS#:84‑69‑5	N.D.	50 mg/kg

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
氟 Fluorine (F)	N.D.	10 mg/kg
氯 Chlorine (Cl)	N.D.	10 mg/kg
溴 Bromine (Br)	N.D.	10 mg/kg
碘 Iodine (I)	N.D.	10 mg/kg

樣品/部位描述 綠色液體
Sample/Part Description Green liquid

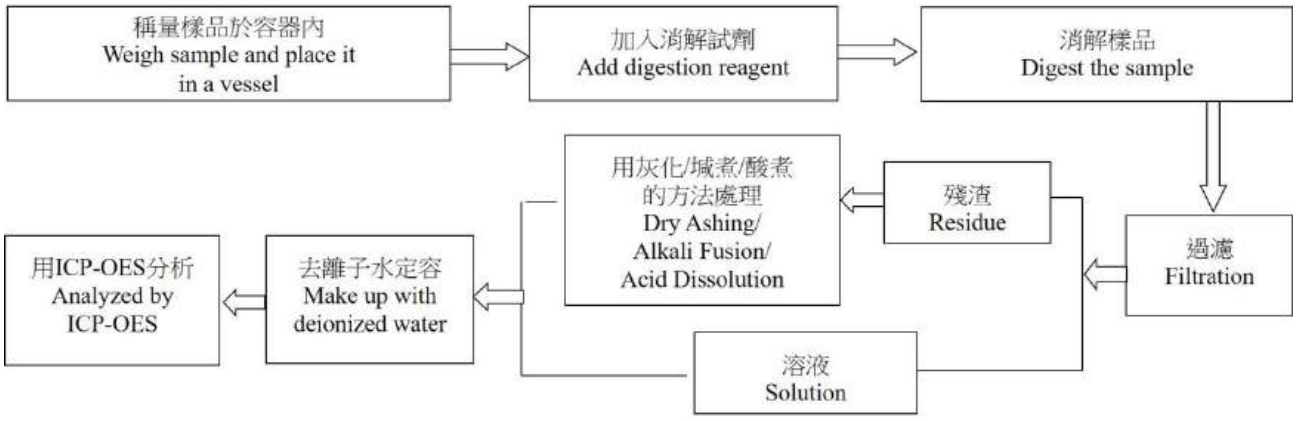
備註: **對於檢測鉛，鎘，汞之樣品已完全溶解。**
- N.D. = 未檢出 (小於方法檢出限)
- mg/kg = ppm = 百萬分之一

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

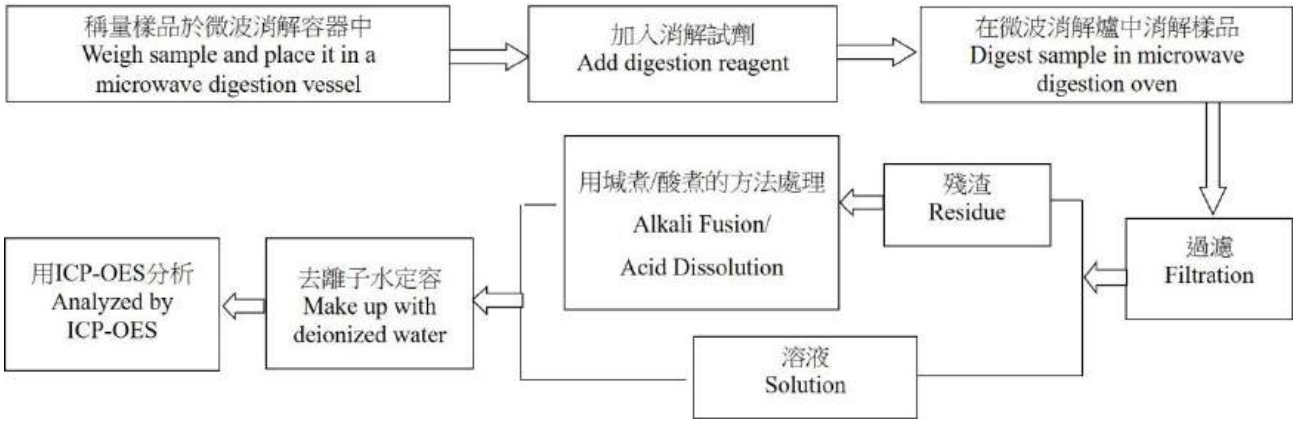
注釋: **本報告中的資料結果供科研、教學、企業內部品質控制、企業產品研發等目的用。**
Note: **The testing data and result(s) in this report is(are) just for scientific research, education, internal quality control and product development etc.**

檢測流程 Test Process

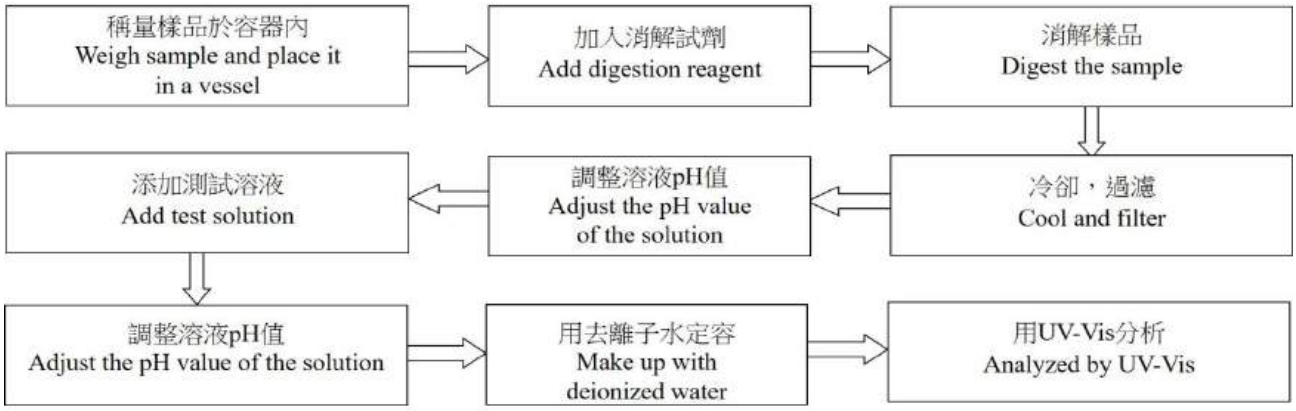
1. 鉛(Pb), 鎘(Cd)
Lead (Pb), Cadmium (Cd)



2. 汞(Hg)
Mercury (Hg)

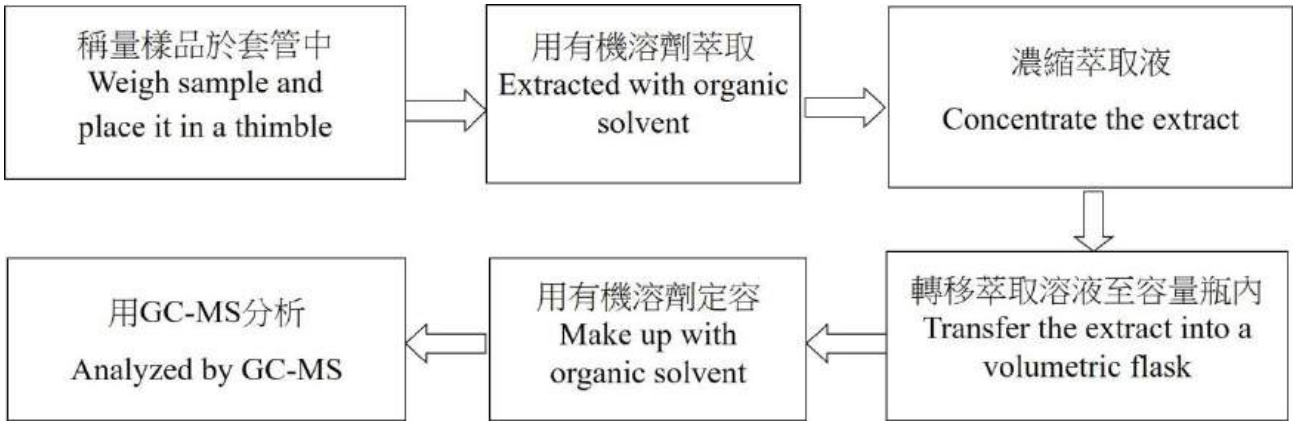


3. 六價鉻(Cr(VI))
Hexavalent Chromium (Cr(VI))

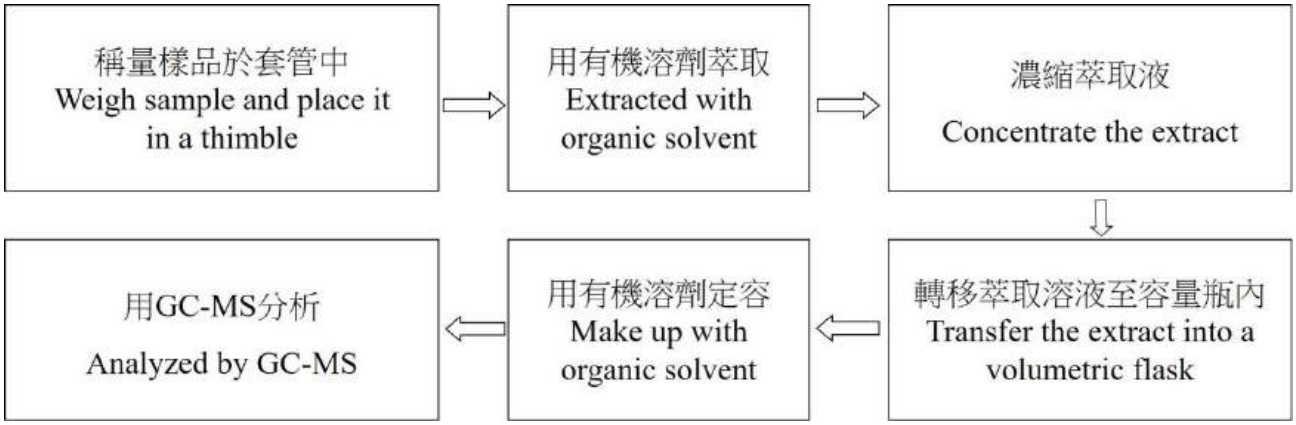


檢測報告
Test Report

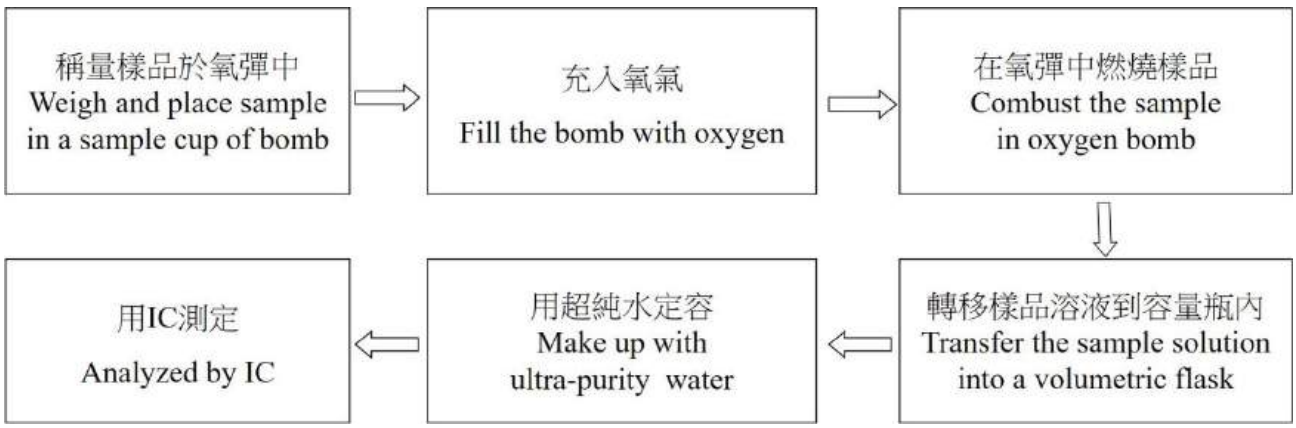
4. 多溴聯苯(PBBs)， 多溴二苯醚(PBDEs)
Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)



5. 鄰苯二甲酸酯(DBP, BBP, DEHP, DIBP)
Phthalates (DBP, BBP, DEHP, DIBP)



6. 氟(F)， 氯(Cl)， 溴(Br)， 碘(I)
Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I)



檢測報告
Test Report

樣品圖片
Photo(s) of the sample(s)

聲明Statement：

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   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. 本報告檢測結果僅對受測樣品負責；
   The result(s) shown in this report refer(s) only to the sample(s) tested;
4. 未經CTI書面同意，不得部分複製本報告；
   Without written approval of CTI, this report can’t be reproduced except in full;
5. 如檢測報告中的英文內容與中文內容有差異，以中文為准。
   In case of any discrepancy between the English version and Chinese version of the testing reports (if generated), the Chinese version shall prevail.

報告結束
*** End of report ***

檢測報告
Test Report

報告編號 A2200452711101006E
Report No. A2200452711101006E

報告抬頭公司名稱
Company Name shown on Report
研澤科技股份有限公司
R‐BRIGHT TECHNOLOGY CO., LTD.

地 址
Address
338 桃園市蘆竹區中興一街61巷5號
NO.5, LN. 61, ZHONGXING 1ST ST., LUZHU DIST., TAOYUAN CITY 338, TAIWAN (R.O.C.)

以下測試之樣品及樣品資訊由申請者提供並確認
The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant

樣品名稱 Sample Name	TINTECH 錫濃縮液(300g/L) TINTECH TIN CONC. (300g/L)
樣品接收日期 Sample Received Date	2020.12.14 Dec. 14, 2020
樣品檢測日期 Testing Period	2020.12.14‐2020.12.18 Dec. 14, 2020 to Dec. 18, 2020
檢測要求 **Test Requested**	根據客戶要求，對所提交樣品中的鉛(Pb)，鎘(Cd)，汞(Hg)，六價鉻(Cr(VI))，多溴聯苯(PBBs)，多溴二苯醚(PBDEs)，鄰苯二甲酸酯(DBP, BBP, DEHP, DIBP)，氟(F)，氯(Cl)，溴(Br)，碘(I)進行測試。 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), Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I) in the submitted sample(s).
檢測依據/檢測結果 **Test Method/Test Result(s)**	請參見下頁。 Please refer to the following page(s).

主 檢
Tested by 徐詩瑞

批 准
Approved by 馮智聰

馮智聰
實驗室經理 Laboratory Manager

審 核
Reviewed by 黃文昕

日 期
Date 2020.12.18

No. R307381724

台灣華測檢測技術有限公司檢測中心
Testing Center, Centre Testing International (Taiwan) Co., Ltd.
桃園市蘆竹區南崁路二段9號5樓之6
5F‐6, No.9, Sec.2, Nankan Rd, Luzhu Dist., Taoyuan, Taiwan

檢測報告
Test Report

檢測依據 Test Method

測試項目 Test Item(s)	測試方法 Test Method	測試儀器 Measured Equipment(s)
鉛 Lead (Pb)	IEC 62321‑5:2013	ICP‑OES
鎘 Cadmium (Cd)	IEC 62321‑5:2013	ICP‑OES
汞 Mercury (Hg)	IEC 62321‑4:2013+AMD1:2017 CSV	ICP‑OES
六價鉻 Hexavalent Chromium (Cr(VI))	IEC 62321‑7‑2:2017	UV‑vis
多溴聯苯 Polybrominated Biphenyls (PBBs)	IEC 62321‑6:2015	GC‑MS
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321‑6:2015	GC‑MS
鄰苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)	IEC 62321‑8:2017	GC‑MS
氟 Fluorine (F)	參考EN 14582:2016 Refer to EN 14582:2016	IC
氯 Chlorine (Cl)	參考EN 14582:2016 Refer to EN 14582:2016	IC
溴 Bromine (Br)	參考EN 14582:2016 Refer to EN 14582:2016	IC
碘 Iodine (I)	參考EN 14582:2016 Refer to EN 14582:2016	IC

檢測報告
Test Report

檢測結果 Test Result(s)

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
鉛 Lead (Pb)	N.D.	2 mg/kg
鎘 Cadmium (Cd)	N.D.	2 mg/kg
汞 Mercury (Hg)	N.D.	2 mg/kg
六價鉻 Hexavalent Chromium (Cr(VI))	N.D.	8 mg/kg

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
多溴聯苯 Polybrominated Biphenyls (PBBs)		
PBBs PBBs (PBBs)	N.D.	/
一溴聯苯 Monobromobiphenyl	N.D.	5 mg/kg
二溴聯苯 Dibromobiphenyl	N.D.	5 mg/kg
三溴聯苯 Tribromobiphenyl	N.D.	5 mg/kg
四溴聯苯 Tetrabromobiphenyl	N.D.	5 mg/kg
五溴聯苯 Pentabromobiphenyl	N.D.	5 mg/kg
六溴聯苯 Hexabromobiphenyl	N.D.	5 mg/kg
七溴聯苯 Heptabromobiphenyl	N.D.	5 mg/kg
八溴聯苯 Octabromobiphenyl	N.D.	5 mg/kg
九溴聯苯 Nonabromobiphenyl	N.D.	5 mg/kg
十溴聯苯 Decabromobiphenyl	N.D.	5 mg/kg

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)		
PBDEs PBDEs (PBDEs)	N.D.	/
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

檢測報告
Test Report

檢測結果 Test Result(s)

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
鄰苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)		
鄰苯二甲酸丁基苄基酯 Butyl benzyl phthalate (BBP) CAS#:85‑68‑7	N.D.	50 mg/kg
鄰苯二甲酸二(2‑乙基)己酯 Di‑(2‑ethylhexyl) phthalate (DEHP) CAS#:117‑81‑7	N.D.	50 mg/kg
鄰苯二甲酸二丁酯 Dibutyl phthalate (DBP) CAS#:84‑74‑2	N.D.	50 mg/kg
鄰苯二甲酸二異丁酯 Diisobutyl phthalate (DIBP) CAS#:84‑69‑5	N.D.	50 mg/kg

測試項目 Tested Item(s)	結果 Result	方法檢出限 MDL
氟 Fluorine (F)	N.D.	10 mg/kg
氯 Chlorine (Cl)	N.D.	10 mg/kg
溴 Bromine (Br)	N.D.	10 mg/kg
碘 Iodine (I)	N.D.	10 mg/kg

樣品/部位描述 淡黃色液體
Sample/Part Description Light yellow liquid

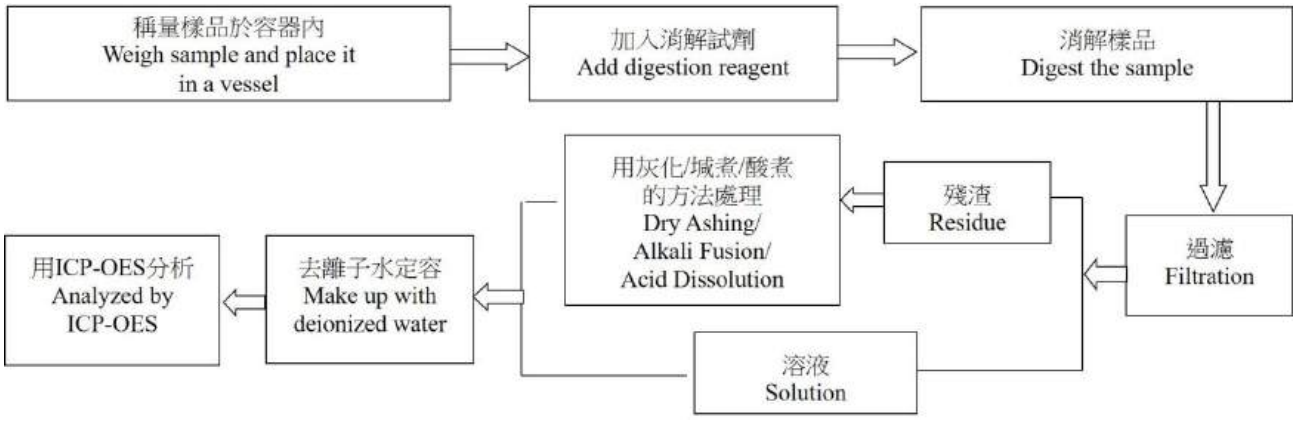
備註: **對於檢測鉛，鎘，汞之樣品已完全溶解。**
- N.D. = 未檢出 (小於方法檢出限)
- mg/kg = ppm = 百萬分之一

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

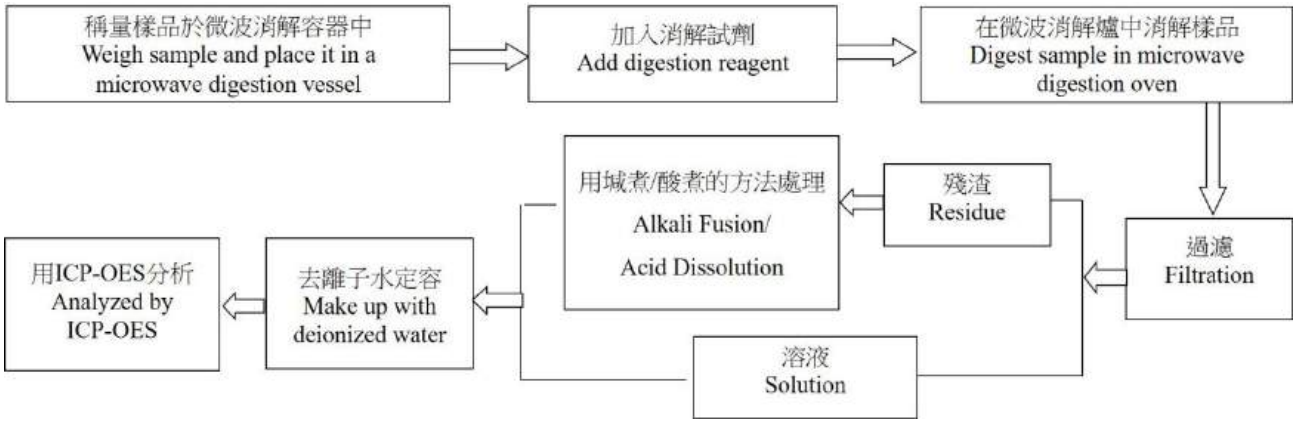
注釋: **本報告中的資料結果供科研、教學、企業內部品質控制、企業產品研發等目的用。**
Note: **The testing data and result(s) in this report is(are) just for scientific research, education, internal quality control and product development etc.**

檢測流程 Test Process

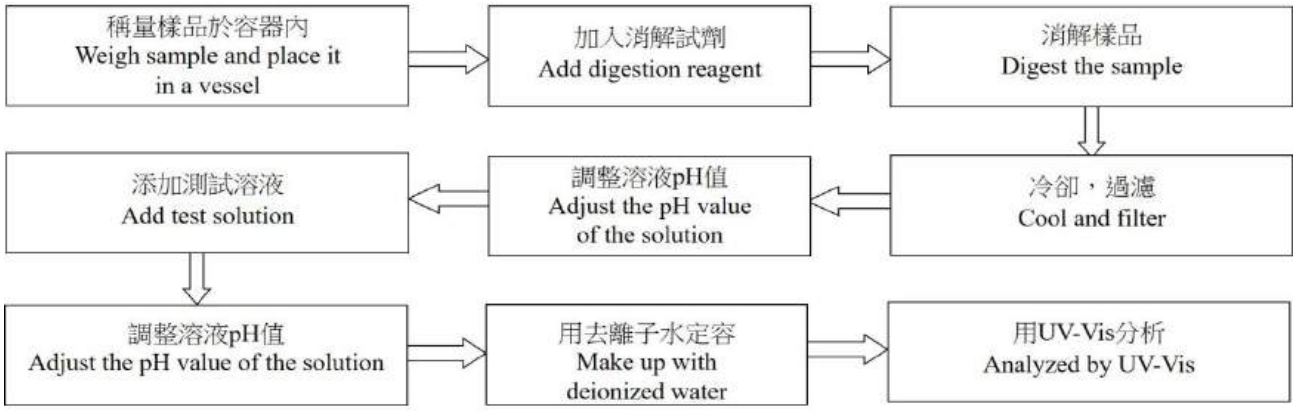
1. 鉛(Pb), 鎘(Cd)
Lead (Pb), Cadmium (Cd)



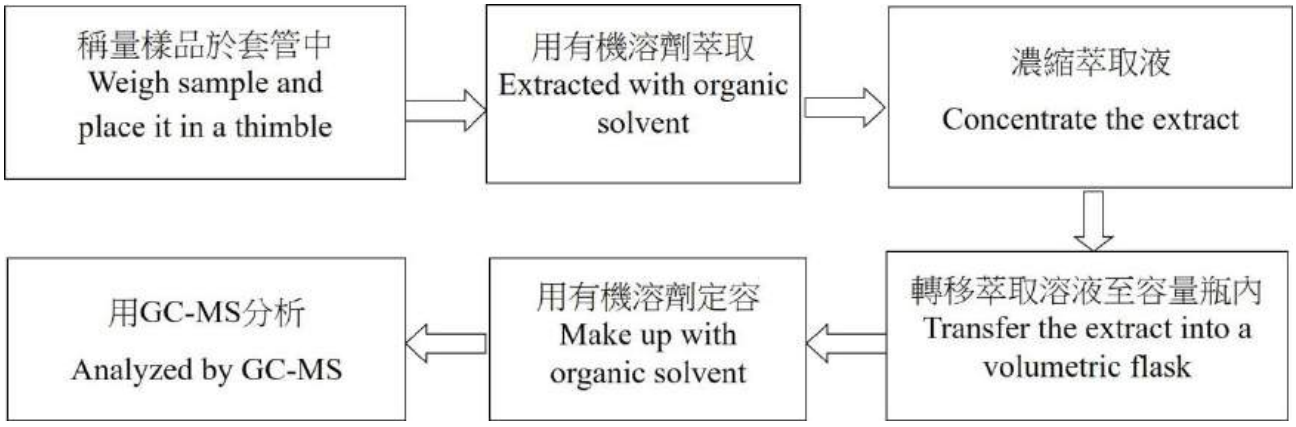
2. 汞(Hg)
Mercury (Hg)



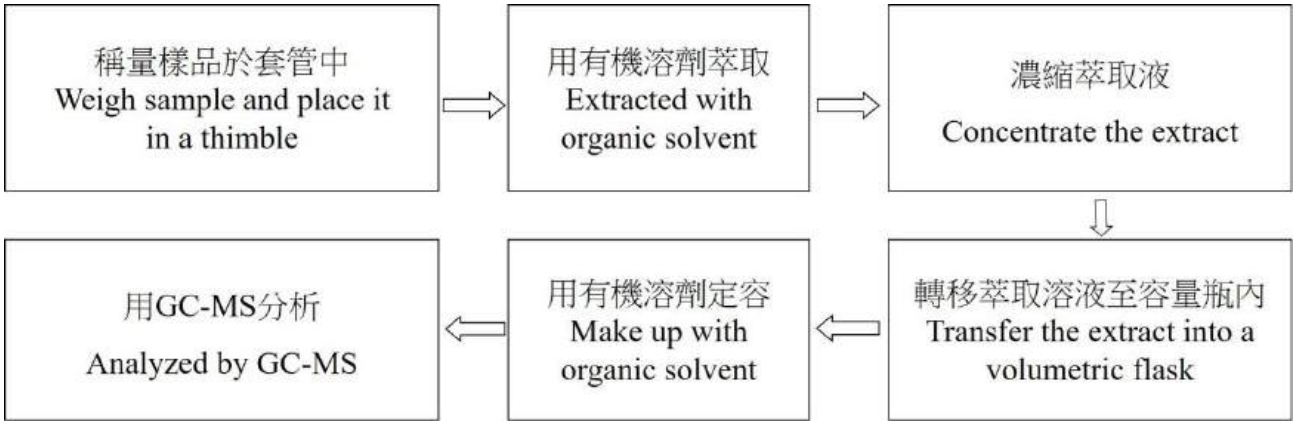
3. 六價鉻(Cr(VI))
Hexavalent Chromium (Cr(VI))



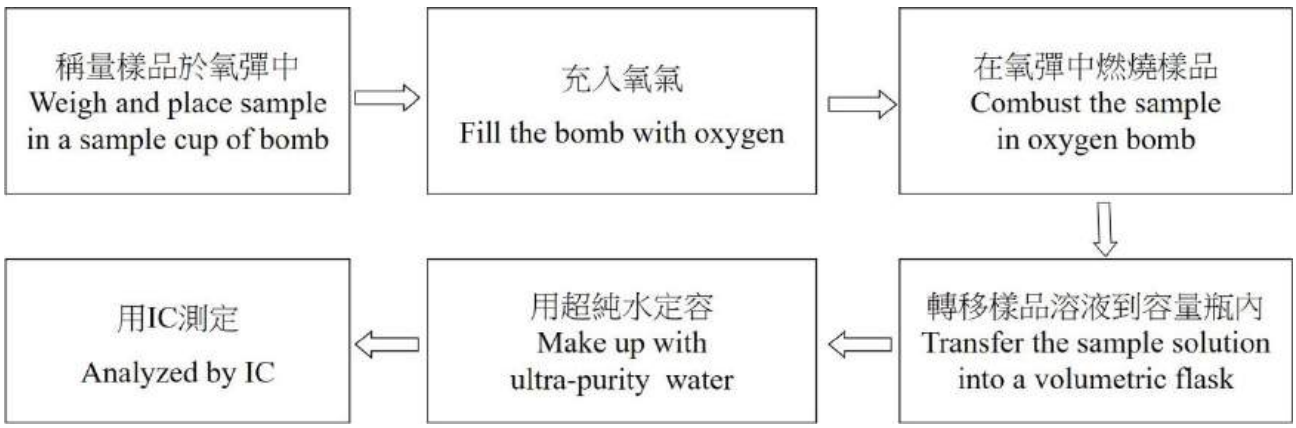
4. 多溴聯苯(PBBs)， 多溴二苯醚(PBDEs)
Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)



5. 鄰苯二甲酸酯(DBP, BBP, DEHP, DIBP)
Phthalates (DBP, BBP, DEHP, DIBP)



6. 氟(F)， 氯(Cl)， 溴(Br)， 碘(I)
Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I)



檢測報告
Test Report

樣品圖片
Photo(s) of the sample(s)

聲明Statement：

1. 檢測報告無批准人簽字、“專用章”及報告騎縫章無效；
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報告結束
*** End of report ***

ATrack 威潤科技股份有限公司
ATrack Technology Inc.

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TW-Q3-QMD-011-02
Rev.1

REACH 高度關注物質宣告書&調查表

公司名稱	詠業科技股份有限公司		聯繫人/職稱	Gary Huang		QA Manager
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ATrack料號	廠商料號/型號	規格說明	備註			
AA02-0037	H2P13EB5DA015K	GPS & GLONASS Patch Antenna(ZP154-JC008)				
EL07-0013	H2U38D1E1B0100	Wi-Fi/Bluetooth Chip Antenna(321613-CW324S)				

供應商用印(公司章)

供應商填寫完畢與用印完成後請回傳電子檔

歐洲化學總署公告高度關切物質(SVHC)清單
清單公告日期：2021/07/08

序號	化學物質名稱	英文名稱	EC 號碼	CAS 號碼	列管日期	納入SVHC 理由	是否含有高關注物質 (Yes/No)	若前項為Yes，其含有高關注物質之濃度百分比 (% by weight or g)
1	鄰苯二甲酸二(2-乙基已基)酯	Bis (2-ethylhexyl)phthalate (DEHP)	204-211-0	117-81-7	2008/10/28	生殖毒性;內分泌干擾特性	No	
2	五氧化二砷	Diarsenic pentaoxide	215-116-9	1303-28-2	2008/10/28	致癌性	No	
3	六溴環十二烷	Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified: Alpha-hexabromocyclododecane Beta-hexabromocyclododecane Gamma-hexabromocyclododecane	247-148-4 and 221-695-9	25637-99-4 3194-55-6 134237-50-6 134237-51-7 134237-52-8	2008/10/28	持久性、生物蓄積性和毒性(PBT)	No	
4	鄰苯二甲酸丁酯苯甲酯	Benzyl butyl phthalate (BBP)	201-622-7	85-68-7	2008/10/28	生殖毒性;內分泌干擾特性	No	
5	砷酸氫鉛	Lead hydrogen arsenate	232-064-2	7784-40-9	2008/10/28	致癌性、生殖毒性	No	
6	短鏈氯化石蠟	Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins)	287-476-5	85535-84-8	2008/10/28	持久性、生物蓄積性和毒性(PBT)、非常持久性和非常生物蓄積性(vPvB)	No	
7	蒽	Anthracene	204-371-1	120-12-7	2008/10/28	持久性、生物蓄積性和毒性(PBT)	No	
8	三氧化二砷	Diarsenic trioxide	215-481-4	1327-53-3	2008/10/28	致癌性	No	
9	鄰苯二甲酸二丁酯	Dibutyl phthalate (DBP)	201-557-4	84-74-2	2008/10/28	生殖毒性;內分泌干擾特性	No	
10	三乙基砷酸酯	Triethyl arsenate	427-700-2	15606-95-8	2008/10/28	致癌性	No	

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11	氧化三丁錫	Bis(tributyltin)oxide (TBTO)	200-268-0	56-35-9	2008/10/28	持久性，生物蓄積性和毒性(PBT)	No	
12	4,4'-二氨基二苯甲烷	4,4'-Diaminodiphenylmethane (MDA)	202-974-4	101-77-9	2008/10/28	致癌性	No	
13	5-叔丁基-2,4,6-三硝基間二甲苯	5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)	201-329-4	81-15-2	2008/10/28	非常持久性和非常生物蓄積性(vPvB)	No	
14	重鉻酸鈉，二倍結晶水	Sodium dichromate	234-190-3	7789-12-0 10588-01-9	2008/10/28	致癌性，致突變性，生殖毒性	No	
15	蒽油,蒽糊	Anthracene oil, anthracene paste	292-603-2	90640-81-6	2010/1/13	致癌性，致突變性，持久性，生物蓄積性和毒性(PBT)，非常持久性和非常生物蓄積性(vPvB)	No	
16	鄰苯二甲酸二異丁酯	Diisobutyl phthalate (DIBP)	201-553-2	84-69-5	2010/1/13	生殖毒性;內分泌干擾特性	No	
17	蒽油,蒽糊,輕油	Anthracene oil, anthracene paste, distn. lights	295-278-5	91995-17-4	2010/1/13	致癌性，致突變性，持久性，生物蓄積性和毒性(PBT)，非常持久性和非常生物蓄積性(vPvB)	No	
18	黃色鉻化鉛酸鉛 (C.I.黃色 34)	Lead sulfochromate yellow (C.I. Pigment Yellow 34)	215-693-7	1344-37-2	2010/1/13	致癌性，生殖毒性	No	
19	煤瀝青,高溫	Pitch, coal tar, high temperature	266-028-2	65996-93-2	2010/1/13	致癌性，持久性，生物蓄積性和毒性(PBT)，非常持久性和非常生物蓄積性(vPvB)	No	
20	氧化鋯矽酸鋁陶瓷耐火纖維	Zirconia Aluminosilicate Refractory Ceramic Fibres are fibres covered by index number 650-017-00-8 in Annex VI, part 3, table 3.1 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, and fulfil the three following conditions: a) oxides of aluminium, silicon and zirconium are the main components present (in the fibres) within variable concentration ranges b) fibres have a length weighted geometric mean diameter less two standard geometric errors of 6 or less micrometres (µm). c) alkaline oxide and alkali earth oxide (Na2O+K2O+CaO+MgO+BaO) content less or	由650-017-00-8選取而得	N/A	2011/12/19	致癌性	No	
21	矽酸鋁陶瓷耐火纖維	Aluminosilicate Refractory Ceramic Fibres are fibres covered by index number 650-017-00-8 in Annex VI, part 3, table 3.1 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, and fulfil the three following conditions: a) oxides of aluminium and silicon are the main components present (in the fibres) within variable concentration ranges b) fibres have a length weighted geometric mean diameter less two standard geometric errors of 6 or less micrometres (µm) c) alkaline oxide and alkali earth oxide (Na2O+K2O+CaO+MgO+BaO) content less or equal to	由650-017-00-8選取而得	N/A	2011/12/19	致癌性	No	
22	蒽油	Anthracene oil	292-602-7	90640-80-5	2010/1/13	致癌性，持久性，生物蓄積性和毒性(PBT)，非常持久性和非常生物蓄積性	No	
23	蒽油,蒽糊,蒽餾分離液	Anthracene oil, anthracene paste, anthracene fraction	295-275-9	91995-15-2	2010/1/13	致癌性，致突變性，持久性，生物蓄積性和毒性(PBT)，非常持久性和非常生物蓄積性(vPvB)	No	
24	三2-(氯乙基)磷酸酯	Tris(2-chloroethyl)phosphate	204-118-5	115-96-8	2010/1/13	生殖毒性	No	
25	2,4-二硝基甲苯	2,4-Dinitrotoluene	204-450-0	121-14-2	2010/1/13	致癌性	No	

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26	蒽油,含蒽量少	Anthracene oil, anthracene-low	292-604-8	90640-82-7	2010/1/13	致癌性、致突變性、持久性、生物蓄積性和毒性(PBT)、非常持久性和非常生物蓄積性(vPvB)	No	
27	鉻酸鉛	Lead chromate	231-846-0	7758-97-6	2010/1/13	致癌性、生殖毒性	No	
28	紅色鉬鉻酸鉛硫酸鹽 (C.I.紅色 104)***	Lead chromate molybdate sulphate red (C.I. Pigment Red 104)	235-759-9	12656-85-8	2010/1/13	致癌性、生殖毒性	No	
29	丙烯醯胺	Acrylamide	201-173-7	79-06-1	2010/3/30	致癌性、致突變性	No	
30	硼酸	Boric acid	233-139-2 234-343-4	10043-35-3 11113-50-1	2010/6/18	生殖毒性	No	
31	鉻酸鉀	Potassium chromate	232-140-5	7789-00-6	2010/6/18	致癌性、致突變性	No	
32	鉻酸鈉	Sodium chromate	231-889-5	7775-11-3	2010/6/18	致癌性、致突變性、生殖毒性	No	
33	三氯乙烯	Trichloroethylene	201-167-4	79-01-6	2010/6/18	致癌性	No	
34	重鉻酸銨	Ammonium dichromate	232-143-1	7789-09-5	2010/6/18	致癌性、致突變性、生殖毒性	No	
35	重鉻酸鉀	Potassium dichromate	231-906-6	7778-50-9	2010/6/18	致癌性、致突變性、生殖毒性	No	
36	水合七氧四硼酸二鈉	Tetraboron disodium heptaoxide, hydrate	235-541-3	12267-73-1	2010/6/18	生殖毒性	No	
37	無水四硼酸二鈉	Disodium tetraborate, anhydrous	215-540-4	1303-96-4 1330-43-4	2010/6/18	生殖毒性	No	
38	乙二醇乙醚	2-Ethoxyethanol	203-804-1	110-80-5	2010/12/15	生殖毒性	No	
39	硫酸鈷（二價）	Cobalt(II) sulphate	233-334-2	10124-43-3	2010/12/15	致癌性、生殖毒性	No	
40	硝酸鈷（二價）	Cobalt(II) dinitrate	233-402-1	10141-05-6	2010/12/15	致癌性、生殖毒性	No	
41	三氧化鉻	Chromium trioxide	215-607-8	1333-82-0	2010/12/15	致癌性、致突變性	No	
42	乙二醇甲醚	2-Methoxyethanol	203-713-7	109-86-4	2010/12/15	生殖毒性	No	
43	醋酸鈷（二價）	Cobalt(II) diacetate	200-755-8	71-48-7	2010/12/15	致癌性、生殖毒性	No	
44	碳酸鈷（二價）	Cobalt(II) carbonate	208-169-4	513-79-1	2010/12/15	致癌性、生殖毒性	No	
45	從三氧化鉻生成的酸類與其它寡體：	Acids generated from chromium trioxide and their oligomers. Names of the acids and their oligomers: Chromic acid, Dichromic acid, Oligomers of chromic acid and dichromic acid.	N/A	N/A	2010/12/15	致癌性	No	
	鉻酸	Chromic acid	231-801-5	7738-94-5			No	
	重鉻酸	Dichromic acid	236-881-5	13530-68-2			No	
	鉻酸與重鉻酸的其它寡體	Oligomers of chromic acid and dichromic acid	N/A	N/A			No	
46	鄰苯二甲酸二-C6-8-支鏈庚酯	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)	276-158-1	71888-89-6	2011/6/20	生殖毒性	No	
47	乙二醇乙醚醋酸酯	2-Ethoxyethyl acetate	203-839-2	111-15-9	2011/6/20	生殖毒性	No	
48	鉻酸鍶	Strontium chromate	232-142-6	7789-06-2	2011/6/20	致癌性	No	
49	聯胺或水合聯胺	Hydrazine	206-114-9	7803-57-8 302-01-2	2011/6/20	致癌性	No	
50	1-甲基吡咯烷酮	1-Methyl-2-pyrrolidone	212-828-1	872-50-4	2011/6/20	生殖毒性	No	
51	鄰苯二甲酸二(C7-11支鏈與直鏈)烷基酯	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	271-084-6	68515-42-4	2011/6/20	生殖毒性	No	
52	1,2,3-三氯丙烷	1,2,3-Trichloropropane	202-486-1	96-18-4	2011/6/20	致癌性、生殖毒性	No	
53	氯化鈷	Cobalt dichloride	231-589-4	7646-79-9	2011/06/20-2008/10/28	致癌性、生殖毒性	No	
54	鉻酸鉻	Dichromium tris(chromate)	246-356-2	24613-89-6	2011/12/19	致癌性	No	
55	酚酞	Phenolphthalein	201-004-7	77-09-8	2011/12/19	致癌性	No	
56	4,4'-亞甲雙(2-氯苯胺) 或稱 2,2'-二氯-4,4'-亞甲基二苯胺	2,2'-dichloro-4,4'-methylenedianiline (MOCA)	202-918-9	101-14-4	2011/12/19	致癌性	No	
57	史蒂芬酸鉛 或稱 2,4,6-三硝基間苯二酚鉛	Lead styphnate	239-290-0	15245-44-0	2011/12/19	生殖毒性	No	
58	疊氮化鉛	Lead azide	236-542-1	13424-46-9	2011/12/19	生殖毒性	No	
59	鄰苯二甲酸二(2-甲氧基乙)酯	Bis(2-methoxyethyl) phthalate	204-212-6	117-82-8	2011/12/19	生殖毒性	No	
60	甲醛與苯胺寡聚反應的產物(工業級 MDA)	Formaldehyde, oligomeric reaction products with aniline (technical MDA)	500-036-1	25214-70-4	2011/12/19	致癌性	No	
61	4-三級辛基苯酚	4-(1,1,3,3-tetramethylbutyl)phenol	205-426-2	140-66-9	2011/12/19	同等關注-可能對環境造成嚴重效應	No	
62	鉻酸五鋅八氫氧化物	Pentazinc chromate octahydroxide	256-418-0	49663-84-5	2011/12/19	致癌性	No	
63	1,2-二氯乙烷	1,2-dichloroethane	203-458-1	107-06-2	2011/12/19	致癌性	No	

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64	砷酸鉛	Trilead diarsenate	222-979-5	3687-31-8	2011/12/19	致癌性、生殖毒性	No	
65	鄰-甲氧苯胺	2-Methoxyaniline; o-Anisidine	201-963-1	90-04-0	2011/12/19	致癌性	No	
66	砷酸	Arsenic acid	231-901-9	7778-39-4	2011/12/19	致癌性	No	
67	N,N-二甲基乙醯胺	N,N-dimethylacetamide (DMAC)	204-826-4	127-19-5	2011/12/19	生殖毒性	No	
68	二苦味酸鉛	Lead dipicrate	229-335-2	6477-64-1	2011/12/19	生殖毒性	No	
69	氫氧化鉻酸鋅鉀	Potassium hydroxyoctaoxodizincatedichromate	234-329-8	11103-86-9	2011/12/19	致癌性	No	
70	二乙二醇二甲醚	Bis(2-methoxyethyl) ether	203-924-4	111-96-6	2011/12/19	生殖毒性	No	
71	砷酸鈣	Calcium arsenate	231-904-5	7778-44-1	2011/12/19	致癌性	No	
72	三乙二醇二甲醚	1,2-bis(2-methoxyethoxy)ethane (TEGDME; triglyme)	203-977-3	112-49-2	2012/6/18	生殖毒性	No	
73	乙二醇二甲醚	1,2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME)	203-794-9	110-71-4	2012/6/18	生殖毒性	No	
74	氧化硼	Diboron trioxide	215-125-8	1303-86-2	2012/6/18	生殖毒性	Yes	0.08%
75	甲醯胺	Formamide	200-842-0	75-12-7	2012/6/18	生殖毒性	No	
76	甲基磺酸鉛	Lead(II) bis(methanesulfonate)	401-750-5	17570-76-2	2012/6/18	生殖毒性	No	
77	異氰尿酸三縮水甘油酯	1,3,5-Tris(oxiran-2-ylmethyl)-1,3,5-triazinane-2,4,6-trione (TGIC)	219-514-3	2451-62-9	2012/6/18	致突變性	No	
78	β型異氰尿酸三縮水甘油酯	1,3,5-tris[(2S and 2R)-2,3-epoxypropyl]-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione (β-TGIC)	423-400-0	59653-74-6	2012/6/18	致突變性	No	
79	4,4'-二(N,N-二甲胺基)二苯基酮(米其勒酮)	4,4'-bis(dimethylamino)benzophenone (Michler's ketone)	202-027-5	90-94-8	2012/6/18	致癌性	No	
80	4,4'-亞甲基雙(N,N-二甲苯胺)(米其勒鹼)	N,N,N',N'-tetramethyl-4,4'-methylenedianiline (Michler's base)	202-959-2	101-61-1	2012/6/18	致癌性	No	
81	鹼性紫3	[4-[4,4'-bis(dimethylamino) benzhydrylidene]cyclohexa-2,5-dien-1-ylidene]dimethylammonium chloride (C.I. Basic Violet 3)	208-953-6	548-62-9	2012/6/18	致癌性**(該物質誰有在含超過濃度0.1%(w/w)的Michler's ketone(EC Number: 202-027-5) 或 Michler's base (EC Number: 202-959-2)的條件下才符合REACH第57條(a)的標準。)	No	
82	C.I. 鹼性藍 26 ([4-[[4-苯胺基-1-萘基][4-(二甲基胺基)苯基]亞甲基]環己-2,5-二烯-1-亞基]二甲基氯化銨	[4-[[4-anilino-1-naphthyl][4-(dimethylamino)phenyl]methylene]cyclohexa-2,5-dien-1-ylidene] dimethylammonium chloride (C.I. Basic Blue 26)	219-943-6	2580-56-5	2012/6/18		No	
83	C.I. 溶劑藍 4 α,α-雙[4-(二甲基胺基)苯基]-4-(苯基胺基)-1-萘甲醇	α,α-bis[4-(dimethylamino)phenyl]-4-(phenylamino)naphthalene-1-methanol (C.I. Solvent [illegible])	229-851-8	6786-83-0	2012/6/18		No	
84	4,4'-雙(二甲基胺基)-4''-(甲基胺基)三苯甲基醇(ECHA官網上沒有C.I. solvent violet 8的寫法)	4,4'-bis(dimethylamino)-4''-(methylamino)trityl alcohol	209-218-2	561-41-1	2012/6/18		No	
85	焦綠石銻鉛黃	Pyrochlore, antimony lead yellow	232-382-1	8012-00-8	2012/12/19	生殖毒性	No	
86	6-甲氧基-間-甲苯胺	6-methoxy-m-toluidine (p-cresidine)	204-419-1	120-71-8	2012/12/19	致癌性	No	
87	全氟十一酸	Henicosafluoroundecanoic acid	218-165-4	2058-94-8	2012/12/19	非常持久性和非常生物蓄積性(vPvB)*	No	
88	甲基六氫鄰苯二甲酐， 4-甲基六氫鄰苯二甲酐， 1-甲基六氫鄰苯二甲酐， 3-甲基六氫鄰苯二甲酐	Hexahydromethylphthalic anhydride, Hexahydro-4-methylphthalic anhydride, Hexahydro-1-methylphthalic anhydride, Hexahydro-3-methylphthalic anhydride [The individual isomers [2], [3] and [4] (including their cis- and trans- stereo isomeric forms) and all possible combinations of the	247-094-1 243-072-0 256-356-4 260-566-1	25550-51-0 19438-60-9 48122-14-1 57110-29-9	2012/12/19	同等關注-可能對人體健康造成嚴重效應	No	
89	六氫鄰苯二甲酐， 六氫酞酸酐， 順1,2-環己二甲酸酐	Cyclohexane-1,2-dicarboxylic anhydride (Hexahydrophthalic anhydride - HHPA)[1] cis-cyclohexane-1,2-dicarboxylic anhydride [2], trans-cyclohexane-1,2-dicarboxylic anhydride [3] [The individual cis- [2] and trans- [3] isomer substances and all possible combinations of the cis- and trans-isomers	201-604-9 236-086-3 238-009-9	85-42-7 13149-00-3 14166-21-3	2012/12/19	同等關注-可能對人體健康造成嚴重效應	No	
90	二氯化二丁錫	Dibutyltin dichloride (DBTC)	211-670-0	683-18-1	2012/12/19	生殖毒性	No	
91	二(四氟硼酸)鉛	Lead bis(tetrafluoroborate)	237-486-0	13814-96-5	2012/12/19	生殖毒性	No	
92	硝酸鉛	Lead dinitrate	233-245-9	10099-74-8	2012/12/19	生殖毒性	No	
93	矽酸鉛	Silicic acid, lead salt	234-363-3	11120-22-2	2012/12/19	生殖毒性	No	

序號	化學物質名稱	英文名稱	EC 號碼	CAS 號碼	列管日期	納入SVHC 理由	是否含有高關注物質 (Yes/No)	若前項為Yes，其含有高關注物質之濃度百分比 (% by weight or g)
94	4-胺基偶氮苯	4-Aminoazobenzene	200-453-6	60-09-3	2012/12/19	致癌性	No	
95	鈦酸鋯鉛氧化物	Lead titanium zirconium oxide	235-727-4	12626-81-2	2012/12/19	生殖毒性	No	
96	一氧化鉛	Lead monoxide (lead oxide)	215-267-0	1317-36-8	2012/12/19	生殖毒性	No	
97	鄰-甲苯胺	o-Toluidine	202-429-0	95-53-4	2012/12/19	致癌性	No	
98	3-乙基-2-甲基-2-(3-甲丁基)-1,3-【口号】唑	3-ethyl-2-methyl-2-(3-methylbutyl)-1,3-oxazolidine	421-150-7	143860-04-2	2012/12/19	生殖毒性	No	
99	摻雜鉛的矽酸鋇	Silicic acid (H2Si2O5), barium salt (1:1), lead-doped [with lead (Pb) content above the applicable generic concentration limit for 'toxicity for reproduction' Repr. 1A (CLP) or category 1 (DSD); the substance is a member of the group entry of lead compounds, with index number 082-001-00-6 in Regulation (EC) No	272-271-5	68784-75-8	2012/12/19	生殖毒性	No	
100	鹼式碳酸鉛	Trilead bis(carbonate)dihydroxide	215-290-6	1319-46-6	2012/12/19	生殖毒性	No	
101	呋喃	Furan	203-727-3	110-00-9	2012/12/19	致癌性	No	
102	二甲基甲醯胺	N,N-dimethylformamide	200-679-5	68-12-2	2012/12/19	生殖毒性	No	
103	乙氧化4-(1,1,3,3-四甲基丁基)苯酚 涵蓋明確定義物質及UVCB物質、聚合物及同系物	4-(1,1,3,3-tetramethylbutyl)phenol, ethoxylated [covering well-defined substances and UVCB substances, polymers and homologues]	N/A	N/A	2012/12/19	同等關注-可能對環境造成嚴重效應	No	
104	支鏈和直鏈-4-壬基酚，有烷基直鏈及/或支鏈以9個碳共價於酚的對位，含蓋所有由單一或多種異構物組合的明確定義物質及UVCB物質	4-Nonylphenol, branched and linear [substances with a linear and/or branched alkyl chain with a carbon number of 9 covalently bound in position 4 to phenol, covering also UVCB- and well-defined substances which include any of the individual isomers or a	N/A	N/A	2012/12/19	同等關注-可能對環境造成嚴重效應	No	
105	4,4'-亞甲基二-鄰-甲苯胺	4,4'-methylenedi-o-toluidine	212-658-8	838-88-0	2012/12/19	致癌性	No	
106	硫酸二乙酯	Diethyl sulphate	200-589-6	64-67-5	2012/12/19	致癌性；致突變性	No	
107	硫酸二甲酯	Dimethyl sulphate	201-058-1	77-78-1	2012/12/19	致癌性	No	
108	鹼式硫酸鉛	Lead oxide sulfate	234-853-7	12036-76-9	2012/12/19	生殖毒性	No	
109	鈦酸鉛(II)	Lead titanium trioxide	235-038-9	12060-00-3	2012/12/19	生殖毒性	No	
110	鹼式乙酸鉛	Acetic acid, lead salt, basic	257-175-3	51404-69-4	2012/12/19	生殖毒性	No	
111	二鹼式鄰苯二甲酸鉛	[Phthalato(2-)]dioxotrilead	273-688-5	69011-06-9	2012/12/19	生殖毒性	No	
112	十溴二苯醚	Bis(pentabromophenyl) ether (decabromodiphenyl ether; DecaBDE)	214-604-9	1163-19-5	2012/12/19	生物蓄積性和毒性(PBT); 非常持久性和非常生物蓄積性(vPvB)	No	
113	N-甲基乙醯胺	N-methylacetamide	201-182-6	79-16-3	2012/12/19	生殖毒性	No	
114	地諾普	Dinoseb (6-sec-butyl-2,4-dinitrophenol)	201-861-7	88-85-7	2012/12/19	生殖毒性	No	
115	乙二醇二乙醚	1,2-Diethoxyethane	211-076-1	629-14-1	2012/12/19	生殖毒性	No	
116	三鹼式硫酸鉛	Tetralead trioxide sulphate	235-380-9	12202-17-4	2012/12/19	生殖毒性	No	
117	鄰苯二甲酸正戊基異戊基酯	N-pentyl-isopentylphthalate	N/A	776297-69-9	2012/12/19	生殖毒性	No	
118	雙(十八酸基)二氧三鉛	Dioxobis(stearato)trilead	235-702-8	12578-12-0	2012/12/19	生殖毒性	No	
119	四乙基鉛	Tetraethyllead	201-075-4	78-00-2	2012/12/19	生殖毒性	No	
120	硫酸四氧化五鉛	Pentalead tetraoxide sulphate	235-067-7	12065-90-6	2012/12/19	生殖毒性	No	
121	全氟十三酸	Pentacosafluorotridecanoic acid	276-745-2	72629-94-8	2012/12/19	非常持久性和非常生物蓄積性(vPvB)	No	
122	全氟十二酸	Tricosafluorododecanoic acid	206-203-2	307-55-1	2012/12/19	非常持久性和非常生物蓄積性(vPvB)	No	
123	全氟十四酸	Heptacosafluorotetradecanoic acid	206-803-4	376-06-7	2012/12/19	非常持久性和非常生物蓄積性(vPvB)	No	
124	1-溴丙烷	1-bromopropane (n-propyl bromide)	203-445-0	106-94-5	2012/12/19	生殖毒性	No	
125	甲氧基乙酸	Methoxyacetic acid	210-894-6	625-45-6	2012/12/19	生殖毒性	No	
126	4-甲基-間-苯二胺 (2,4-二胺基甲苯)	4-methyl-m-phenylenediamine (toluene-2,4-diamine)	202-453-1	95-80-7	2012/12/19	致癌性	No	
127	環氧丙烷	Methyloxirane (Propylene oxide)	200-879-2	75-56-9	2012/12/19	致癌性；致突變性	No	
128	三鹼式亞磷酸鉛	Trilead dioxide phosphonate	235-252-2	12141-20-7	2012/12/19	生殖毒性	No	
129	鄰-胺基偶氮甲苯	o-aminoazotoluene	202-591-2	97-56-3	2012/12/19	致癌性	No	
130	支鏈和直鏈1,2-苯二甲酸二戊酯	1,2-Benzenedicarboxylic acid, dipentylester, branched and linear	284-032-2	84777-06-0	2012/12/19	生殖毒性	No	
131	4,4'-氧二苯胺及其鹽類	4,4'-oxydianiline and its salts	202-977-0	101-80-4	2012/12/19	致癌性;致突變性	No	

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132	四氧化三鉛(鉛丹)	orange lead (Lead tetroxide)	215-235-6	1314-41-6	2012/12/19	生殖毒性	No	
133	4-胺基聯苯	Biphenyl-4-ylamine	202-177-1	92-67-1	2012/12/19	致癌性	No	
134	鄰苯二甲酸二異戊酯	Diisopentylphthalate	210-088-4	605-50-5	2012/12/19	生殖毒性	No	
135	C16-18-脂肪酸鉛鹽	Fatty acids, C16-18, lead salts	292-966-7	91031-62-8	2012/12/19	生殖毒性	No	
136	1,1'-偶氮雙甲醯胺	Diazene-1,2-dicarboxamide (C,C'-azodi(formamide))	204-650-8	123-77-3	2012/12/19	同等關注-可能對人體健康造成嚴重效應	No	
137	亞硫酸鉛	Sulfurous acid, lead salt, dibasic	263-467-1	62229-08-7	2012/12/19	生殖毒性	No	
138	氰胺化鉛	Lead cyanamidate	244-073-9	20837-86-9	2012/12/19	生殖毒性	No	
139	鎘	Cadmium	231-152-8	7440-43-9	2013/6/20	致癌性	No	
140	氧化鎘	Cadmium oxide	215-146-2	1306-19-0	2013/6/20	致癌性	No	
141	全氟辛酸銨	Ammonium pentadecafluorooctanoate (APFO)	223-320-4	3825-26-1	2013/6/20	生殖毒性、持久性、生物蓄積性和毒性(PBT)	No	
142	全氟辛酸	Pentadecafluorooctanoic acid (PFOA)	206-397-9	335-67-1	2013/6/20	生殖毒性、持久性、生物蓄積性和毒性(PBT)	No	
143	鄰苯二甲酸二戊酯	Dipentyl phthalate (DPP)	205-017-9	131-18-0	2013/6/20	生殖毒性	No	
144	分支或線性的壬基酚，包括含有9個碳烷基鏈的所有獨立的同分異構物和所有含有線性或分支9個碳烷基鏈的UVCB物質	4-Nonylphenol, branched and linear, ethoxylated [substances with a linear and/or branched alkyl chain with a carbon number of 9 covalently bound in position 4 to phenol, ethoxylated covering UVCB- and well-defined substances, polymers and homologues, which include any of the individual isomers and/or	N/A	N/A	2013/6/20	可能對環境造成嚴重之危害(因其降解產物之內分泌干擾特性)	No	
145	硫化鎘	Cadmium sulphide	215-147-8	1306-23-6	2013/12/16	致癌性; 同等關注-可能對人體健康造成嚴重效應	No	
146	鄰苯二甲酸二己酯	Dihexyl phthalate	201-559-5	84-75-3	2013/12/16	生殖毒性	No	
147	直接紅28	Disodium 3,3'-[[1,1'-biphenyl]-4,4'-diylbis(azo)]bis(4-aminonaphthalene-1-sulphonate) (C.I. Direct Red 28)	209-358-4	573-58-0	2013/12/16	致癌性	No	
148	直接黑38	Disodium 4-amino-3-[[4'-[(2,4-diaminophenyl)azo][1,1'-biphenyl]-4-yl]azo] -5-hydroxy-6-(phenylazo)naphthalene-2,7-disulphonate (C.I. Direct	217-710-3	1937-37-7	2013/12/16	致癌性	No	
149	咪乙硫脲(咪唑啉-2-硫酮)	Imidazolidine-2-thione; (2-imidazoline-2-thiol)	202-506-9	96-45-7	2013/12/16	生殖毒性	No	
150	醋酸鉛	Lead di(acetate)	206-104-4	301-04-2	2013/12/16	生殖毒性	No	
151	磷酸三(二甲苯)酯	Trixylyl phosphate	246-677-8	25155-23-1	2013/12/16	生殖毒性	No	
152	氯化鎘	Cadmium chloride	233-296-7	10108-64-2	2014/06/16	致癌性; 致突變性; 生殖毒性; 同等關注-可能對人體健康造成嚴重效應	No	
153	支鏈和直鏈的1,2-苯二甲酸二己酯	1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear	271-093-5	68515-50-4	2014/06/16	生殖毒性	No	
154	過硼酸鈉	Sodium peroxometaborate	231-556-4	7632-04-4	2014/06/16	生殖毒性	No	
155	過硼酸鈉	Sodium perborate; perboric acid, sodium salt	239-172-9 234-390-0	N/A	2014/06/16	生殖毒性	No	
156	氟化鎘	Cadmium fluoride	232-222-0	7790-79-6	2014/12/17	致癌性; 致突變性; 生殖毒性; 同等關注-可能對人體健康造成嚴重效應	No	
157	硫酸鎘	Cadmium sulphate	233-331-6	10124-36-4, 31119-53-6	2014/12/17	致癌性; 致突變性; 生殖毒性; 同等關注-可能對人體健康造成嚴重效應	No	
158	2-苯并三唑-2-基-4,6-二-三級-丁基苯酚(UV-320)	2-benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320)	223-346-6	3846-71-7	2014/12/17	生物蓄積性和毒性(PBT);非常持久性和非常生物蓄積性(vPvB)	No	
159	2-(2H-苯并三唑-2-基)-4,6-二三級戊基苯酚 (UV-328)	2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol (UV-328)	247-384-8	25973-55-1	2014/12/17	生物蓄積性和毒性(PBT);非常持久性和非常生物蓄積性(vPvB)	No	
160	10-乙基-4,4-二辛基-7-側氧-8-氧代-3,5-二硫代-4-錫代十四酸2-乙基己酯(DOTE)	2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (DOTE)	239-622-4	15571-58-1	2014/12/17	生殖毒性	No	
161	10-乙基-4,4-二辛基-7-氧-8-氧代-3,5-二硫代-4-錫代十四酸2-乙基己酯和10-乙基-4-[[2-[(2-乙基己基)氧]-2-氧乙基]硫代]-4-辛基-7-氧-8-氧代-3,5-二硫代-4-錫代十四酸2-乙基己酯的反應產物 (DOTE 和 MOTE 的反應產物)	reaction mass of 2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate and 2-ethylhexyl 10-ethyl-4-[[2-[(2-ethylhexyl)oxy]-2-oxoethyl]thio]-4-octyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (reactionmass of DOTE and MOTE)	N/A	N/A	2014/12/17	生殖毒性	No	

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162	1,2-苯二甲酸二C6-10 烷基酯；1,2-苯二甲酸混合癸烷己和辛二酯，包含≥0.3%	1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters; 1,2-benzenedicarboxylic	271-094-0 272-013-1	68515-51-5 68648-93-1	2015/06/15	生殖毒性	No No	
163	包含以下[1]與[2]之所有單獨立體異構物與其組成。 [1]5-二級丁基-2-(2,4-二甲基環己-3-烯-1-基)-5-甲基-1,3-二【口哥】【口東】 [2]5-二級丁基-2-(4,6-二甲基環己-3-烯-1-基)-5-甲基-1,3-二【口哥】【口東】	5-sec-butyl-2-(2,4-dimethylcyclohex-3-en-1-yl)-5-methyl-1,3-dioxane(1),5-sec-butyl-2-(4,6-dimethycyclohex-3-en-1-yl)-5-methyl-1,3-dioxane(2)(covering any of the individual streoisomers of (1) and (2) or any combination thereof)	N/A	N/A	2015/06/15	非常持久性和非常生物蓄積性(vPvB)	No	
164	硝苯	Nitrobenzene	202-716-0	98-95-3	2015/12/17	生殖毒性	No	
165	2,4-貳三級丁基-6-(5-氯苯三唑-2-基)苯酚	2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol	223-383	3864-99-1	2015/12/17	非常持久性和非常生物蓄積(vPvB)	No	
166	2-(2H-苯并三唑-2-基)-4-三級丁基-6-二	2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl)phenol (UV-350)	253-037-1	36437-37-3	2015/12/17	非常持久性和非常生物蓄積(vPvB)	No	
167	1,3-丙磺內酯	1,3-propanesultone	214-317-9	1120-71-4	2015/12/17	致癌性	No	
168	全氟十酸及其鈉與銨鹽	Perfluorononan-1-oic-acid and its sodium and	206-801-3	375-95-1	2015/12/17	生殖毒性; 生物蓄積性和毒性(PBT)	No	
169	苯并[a]芘	Benzo[def]chrysene (Benzo[a]pyrene)	200-028-5	50-32-8	2016/06/20	致癌性; 致突變性; 生殖毒性; 生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	
170	雙酚A	4,4'-isopropylidenediphenol	201-245-8	80-05-7	2017/01/12	生殖毒性; 內分泌干擾特性-人體健康;內分泌干擾特性-環境	No	
171	支鏈與直鏈4-庚基苯酚烷基直鏈及/或支鏈以7個碳共價於酚的對位, 含蓋所有由單一或多種異構物組合的明確定義物質及UVCB 物質	4-Heptylphenol,branched and linear substances with a linear and/or branched alkyl chain with a carbon number of 7 covalently bound predominantly in position 4 to phenol,covering also UVCB-and well-defined substances which include any of the individual isomers or a combination thereof	N/A	N/A	2017/01/12	同等關注-可能對環境造成嚴重效應	No	
172	全氟癸酸，及其鈉與銨鹽 全氟癸酸銨 全氟癸酸鈉	Nonadecafluorodecanoic acid (PFDA) and its sodium and ammonium salts;Ammoniumnonadecafluorodecanoate Decanoicacid,nonadecafluoro-, sodium	206-400-3 221-470-5 N/A	335-76-2 3108-42-7 3830-45-3	2017/01/12	生殖毒性	No	
173	對-(1,1-二甲基丙苯)苯酚	p-(1,1-dimethylpropyl)phenol	201-280-9	80-46-6	2017/01/12	同等關注-可能對環境造成嚴重效應	No	
174	對-(1,1-二甲基丙苯)苯酚	Perfluorohexane-1-sulphonic acid and its salts	N/A	N/A	2017/07/07	非常持久性和非常生物蓄積(vPvB))	No	
175	1,2-苯并菲; (【**快】)	Chrysene	205-923-4	218-01-9	2018/01/15	致癌性; 生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性	No	
176	苯[a]蒽	Benz[a]anthracene	200-280-6	56-55-3	2018/01/15	致癌性; 生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	
177	硝酸鎘	Cadmium nitrate	233-710-6	10325-94-7	2018/01/15	致癌性; 致突變性; 特定標的器官系統毒性～重複暴露(人體健康)	No	
178	氫氧化鎘	Cadmium hydroxide	244-168-5	21041-95-2	2018/01/15	致癌性; 致突變性; 特定標的器官系統毒性～重複暴露(人體健康)	No	
179	碳酸鎘	Cadmium carbonate	208-168-9	513-78-0	2018/01/15	致癌性; 致突變性; 特定標的器官系統毒性～重複暴露(人體健康)	No	
180	1,6,7,8,9,14,15,16,17,17,18,18-十二氯五[12.2.1.16,9.02,13.05,10]十八碳-7,15-二烯("Dechlorane Plus"TM)[含有其任何單獨的反式和順式異構體或其任何組合]	1,6,7,8,9,14,15,16,17,17,18,18-Dodecachloropentacyclo[12.2.1.16,9.02,13.05,10]octadeca-7,15-diene ("Dechlorane Plus"TM) [covering any of its individual anti- and syn-isomers or any combinationthereof]	N/A	N/A	2018/01/15	非常持久性和非常生物蓄積性(vPvB)	No	
181	1,3,4-噻二唑-2,5-二硫醇與甲醛和支鏈和直鏈4-庚基酚的反應產物(RP-HP) [含有≥0.1%w/w支鏈和直鏈的4-庚基酚	Reaction products of 1,3,4-thiadiazolidine-2,5-dithione,formaldehyde and 4-heptylphenol, branched and linear (RP-HP) [with ≥0.1% w/w 4-heptylphenol, branched and linear]	N/A	N/A	2018/01/15	內分泌干擾特性-環境	No	
182	1,2,4-苯三甲酸酐	Benzene-1,2,4-tricarboxylic acid 1,2 anhydride (trimellitic anhydride; TMA	209-008-0	552-30-7	2018/06/27	呼吸道致敏性質-人體健康	No	
183	苯并[g,h,I]苝	Benzo[ghi]perylene	205-883-8	191-24-2	2018/06/27	生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	

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184	十甲基環五矽氧烷	Decamethylcyclopentasiloxane (D5)	208-764-9	541-02-6	2018/06/27	生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	
185	鄰苯二甲酸二環己酯	Dicyclohexyl phthalate (DCHP)	201-545-9	84-61-7	2018/06/27	生殖毒性; 內分泌干擾特性-人體健康	No	
186	八硼酸二鈉	Disodium octaborate	234-541-0	12008-41-2	2018/06/27	生殖毒性	No	
187	十二甲基環六矽氧烷	Dodecamethylcyclohexasiloxane (D6)	208-762-8	540-97-6	2018/06/27	生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	
188	乙二胺	Ethylenediamine (EDA)	203-468-6	107-15-3	2018/06/27	呼吸道致敏性質-人體健康	No	
189	鉛	Lead	231-100-4	7439-92-1	2018/06/27	生殖毒性	No	
190	八甲基環四矽氧烷	Octamethylcyclotetrasiloxane (D4)	209-136-7	556-67-2	2018/06/27	生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	
191	氫化聚三苯	Terphenyl, hydrogenated	262-967-7	61788-32-7	2018/06/27	非常持久性和非常生物蓄積性(vPvB)	No	
							No	
192	2,2-雙(4'-羥苯基)-4-甲基戊烷	2,2-bis(4'-hydroxyphenyl)-4-methylpentane	401-720-1	6807-17-6	2019/1/15	生殖毒性	No	
193	苯并[k]1,2-苯并芘	Benzo[k]fluoranthene	205-916-6	207-08-9	2019/1/15	致癌性(1B);生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	
194	1,2-苯并芘	Fluoranthene	205-912-4	206-44-0	2019/1/15	生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	
195	菲	Phenanthrene	201-581-5	85-01-8	2019/1/15	非常持久性和非常生物蓄積性(vPvB)	No	
196	芘	Pyrene	204-927-3	129-00-0	2019/1/15	生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	
197	1,7,7-三甲基-3-(苯亞甲基)雙環[2.2.1]庚-2-酮（3-亞苄基樟腦）	1,7,7-trimethyl-3-(phenylmethylene) bicyclo[2.2.1]heptan-2-one (3-benzylidene camphor)	239-139-9	15087-24-8	2019/1/15	內分泌干擾性質-環境	No	
198	參(支鏈和直鏈 4-壬基苯基)亞磷酸酯(TNPP)，含有≥0.1% w / w 的支鏈和直鏈 4-壬基酚 (4-NP)	Tris(4-nonylphenyl, branched and linear) phosphite (TNPP) with ≥ 0.1% w/w of 4-nonylphenol, branched and linear (4-NP)	N/A	N/A	2019/01/15	生殖毒性(Article 57a)	No	
199	4-三級丁酚	4-tert-butylpheno	202-679-0	98-54-4	2019/07/16	內分泌干擾性質-環境 (Article 57(f) - 環境)	No	
200	乙酸 2-甲氧基乙酯	2-methoxyethyl acetate	203-772-9	110-49-6	2019/07/16	生殖毒性(Article 57a)	No	
201	2,3,3,3-四氟-2-(七氟丙氧基)丙酸、其鹽類及其醯基鹵化物(包含其各自的異構體及其組合)	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propionic acid, its salts and its acyl halides covering any of their individual isomers and combinations thereof	N/A	N/A	2019/07/16	同等關注-可能對人體健康造成嚴重效應 (Article 57f-環境)	No	
202	鄰苯二甲酸二異己酯	Diisohexyl phthalate	276-090-2	71850-09-4	2020/1/16	生殖毒性(Article 57a)	No	
203	2-苄基-2-二甲胺基-4'-【口末】啉丁醯苯	2-benzyl-2-dimethylamino-4'morpholinobutyrophenone	404-360-3	119313-12-1	2020/1/16	生殖毒性(Article 57a)	No	
204	2-甲基-1-(4-甲基硫苯基)-2【口末】啉丙-1-酮	methyl-1-(4-methylthiophenyl)-2-morpholinopropan-1-o	400-600-6	71868-10-5	2020/1/16	生殖毒性(Article 57a)	No	
205	全氟丁烷磺酸及其鹽類	Perfluorobutane sulfonic acid (PFBS)and its salts	N/A	N/A	2020/1/16	同等關注-可能對人體健康造成嚴重效應 (Article 57f-環境)	No	
206	1-乙烯基咪唑	1-vinylimidazole	214-012-0	1072-63-5	2020/6/25	生殖毒性	No	
207	2-甲基咪唑	2-methylimidazole	211-765-7	693-98-1	2020/6/25	生殖毒性	No	
208	4-羥基苯甲酸丁酯	butyl 4-hydroxybenzoate	202-318-7	94-26-8	2020/6/25	同等關注-可能對人體 健康造成嚴重效應	No	
209	二丁基雙(2,4-戊二酮基)錫	Dibutylbis(pentane-2,4-dionato-O,O')tin	245-152-0	22673-19-4	2020/6/25	生殖毒性	No	

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210	雙(2-(2-甲氧基乙氧基)乙基)醚	Bis(2-(2-methoxyethoxy)ethyl)ether	205-594-7	143-24-8	2021/1/19	生殖毒性	No	
211	二月桂酸二辛基錫；二辛基錫烷雙(椰油醯氧基)衍生物；以及任何其他二辛基-錫烷雙(椰油醯氧基)衍生物且脂肪醯氧基部分的主要碳數為 C12	Dioctyltin dilaurate, stannane, dioctyl-, bis(coco acyloxy) derivs., and any other stannane, dioctyl-, bis(fatty acyloxy) derivs. wherein C12 is the predominant carbon number of the fatty acyloxy moiety	-	-	2021/1/19	生殖毒性	No	
	二月桂酸二辛基錫；二辛基錫烷雙(椰油醯氧基)衍生物	dioctyltin dilaurate; stannane, dioctyl-, bis(coco acyloxy) derivs.	-	-			No	
	二辛基-錫烷雙(椰油醯氧基)衍生物	Stannane, dioctyl-, bis(coco acyloxy) derivs.	293-901-5	91648-39-4			No	
	二月桂酸二辛基錫	Dioctyltin dilaurate	222-883-3	3648-18-8			No	
212	1,4-二【口哼】烷 (1,4-二氧陸圜)	1,4-dioxane	204-661-8	123-91-1	2021/7/8	致癌性；同等關注-可能對人體健康造成嚴重效應；同等關注-可能對環境造成嚴重效應	No	
213	(1)2,2-雙(溴甲基)-1,3-丙二 醇(BMP)	(1)2,2-bis(bromomethyl)propane1,3-diol (BMP);	(1) 221-967-7;	(1)3296-90-0; (2)36483-57-5/	2021/7/8	致癌性	No	
214	2-(4-三級丁基苄基)丙醛及其獨立體異構物 (含多筆物質，詳細列表請參考 ECHA SVHC 官網)	2-(4-tertbutylbenzyl)propionaldehyde and its individual stereoisomers: (2R)-3-(4-tert-butylphenyl)-2-methylpropanal; 2-(4-tertbutylbenzyl)propionaldehyde; (2S)-3-(4-tert-butylphenyl)-2-methylpropanal	- '201-289-8; -	75166-31-3; 80-54-6; 75166-30-2	2021/7/8	生殖毒性	No	
215	4,4'-(1-甲基亞丙基)雙酚 (雙酚 B)	4,4'-(1-methylpropylidene)bisphenol 2	201-025-1	77-40-7	2021/7/8	內分泌干擾性質-人體健康; 內分泌干擾性質-環境	No	
216	戊二醛	glutaral	203-856-5	111-30-8	2021/7/8	吸道致敏性質-人體健康	No	
217	中鏈氯化石蠟(MCCP) [UVCB 物質，由大於或等於 80%直鏈氯代烷烴組成，其碳鏈長度範圍在 C14 至C17 之間] (含多筆物質，詳細列表請參考 ECHA SVHC 官網)	Medium-chain chlorinated paraffins (MCCP) UVCB substances consisting of more than or equal to 80% linear chloroalkanes with carbon chain lengths within the range from C14 to C17	-	-	2021/7/8	持久性、生物蓄積性和毒性(PBT)；非常持久性和非常生物蓄積性(vPvB)	No	
218	硼酸鈉鹽 (含多筆物質，詳細列表請參考 ECHA SVHC 官網)	orthoboric acid, sodium salt; boric acid (H3BO3), sodium salt, hydrate; Boric acid (H3BO3), disodium salt; Trisodium orthoborate; Boric acid, sodium salt; Orthoboric acid, sodium salt; Boric acid (H3BO3), sodium salt (1:1)	-; -; 238-253-6; 215-604-1; 237-560-2; -;	25747-83-5; 22454-04-2; 14312-40-4; 1333-73-9; 13840-56-7; 14890-53-0;	2021/7/8	生殖毒性	No	

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219	由寡聚合反應形成具有主要C12 支鏈烷基酚的烷基化(主要在對位)產物，包括任何獨立同分異構物及/或相關組合 (PDDP) (含多筆物質，詳細列表請參考 ECHA SVHC 官網)	Phenol, alkylation products (mainly in para position) with C12-rich branched alkyl chains from oligomerisation, covering any individual isomers and/or combinations thereof (PDDP); Phenol, 4-dodecyl, branched ; 4-isododecylphenol ; Phenol, 4-isododecyl- ; Phenol, dodecyl-, branched ; Phenol, (tetrapropenyl) derivatives ; Phenol, tetrapropylene-	-; -; -; 310-154-3; -; -	210555-94-5; 27459-10-5; 27147-75-7; 121158-58-5; 74499-35-7; 57427-55-1	2021/7/8	生殖毒性; 內分泌干擾性質-人體健康;內分泌干擾性質-環境	No	

備註：此版本更新日期為 2021年07月08日。*參考中文名稱僅為提供額外參考之 SVHC 物質中文命名，為確保物質辨識資訊正確性與即時性， 請依 ECHA 網站公布之最新清單與辨識資訊為主。
ECHA 網站高度關切物質候選清單 http://echa.europa.eu/candidate-list-table

ATrack 威潤科技股份有限公司

禁用衝突礦物聲明保證書

公司名稱	詠業科技股份有限公司	聯繫人	Gary Huang
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產品/材料	1. H2P13EB5DA015K:GPS & GLONASS Patch Antenna(ZP154-JC008) 2. H2U38D1E1B0100:Wi-Fi/Bluetooth Chip Antenna(321613-CW324S) (以下簡稱產品)		

立書人 詠業科技股份有限公司 **(以下簡稱本公司)** 願遵從威潤科技股份有限公司(以下簡稱威潤科技)的環保政策並依據 EICC (Electronic Industry Citizenship Coalition) 與 GESI (Global e-Sustainability Initiative) 的說明避免採用所謂的衝突礦產，指來自於中非剛果民主共和國及其鄰近國家，透過非法採礦所取得的金(Au)、鉭(Ta)、鎢(W)、鈷 (Co) 和錫(Sn)等金屬礦物。當地軍事團體透過非法採礦的利潤購買軍火助長武力衝突，濫用童工與強迫勞動，造成區域動盪。

一、**本公司**出售予**威潤科技**之所有產品願為以下承諾：

本公司保證遵守並禁用衝突礦區之衝突礦物於出貨的產品上，所出售予威潤科技之所有產品其所使用之原、物料、包裝、溶劑、染劑、耗材、附屬物件及製程等，均不含且不使用來自衝突礦區的金屬，並配合威潤科技對於全球環保議題的重視及其客戶的承諾，經本公司書面同意後，隨時予以增減或刪除等調整。

二、各項標準變更之處置:

1. 前項約定之各項標準或要求，威潤科技得因**相關法令變動或客戶要求**隨時以書面增加、修改、刪除，惟仍須通知本公司並取得書面同意。
2. 當本公司產品無法達成威潤科技所要求之標準時，應於**雙方協議期間內以書面或E-Mail 通知。**違反前述情形者，威潤科技得將供應商之評比列入汰換候補名單並可逕行終止往來。
3. 若威潤科技客戶或第三人對於本公司產品有疑慮時，本公司絕對配合威潤科技之要求提出說明解釋並提供相關資料，檢測報告等文件證明。
4. 若本公司提供之產品非自行製造生產者時，應代為取得製造者所出具之保證書(承諾書/自我宣告)給予威潤科技，並依法負相關之責。

本公司已確實了解禁用衝突金屬等相關法令，願與**威潤科技**一起為世界建立永續價值鏈與環境保護共同努力。

詠業科技股份有限公司 董事印

負責人 蘇關建

2021.12.13

公司用印　　負責人用印&日期