

## Test Report

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SIRECTIFIER GLOBAL CORPORATION., DELAWARE, U. S. A.  
113 BARKSDALE PROFESSIONAL CENTER IN THE CITY OF NEWARK,  
COUNTY OF NEW CASTLE



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

Sample Description : SCHOTTKY, FRED, TVS, ZENER, SWITCHING DIODE, REGULATOR, MOSFET  
Style/Item No. : MBR, SBL, MUR, SB, MR, SERIALS, TO-220, ITO-220, TO-247, TO-3P...ETC DIP  
PACKAGE  
Sample Receiving Date : 2011/11/14  
Testing Period : 2011/11/14 TO 2011/11/21

=====  
**Test Result(s)** : Please refer to next page(s).

**Conclusion** : Base upon the performed tests by submitted samples, the test results of PAHs comply with the PAHs requirement according to (Category 1) of ZEK 01.2-08 of German ZLS and its amendments.

  
  
**Chenyu Kung / Operation Manager**  
**Signed for and on behalf of**  
**SGS TAIWAN LTD.**  
**Chemical Laboratory – Taipei**

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## Test Result(s)

PART NAME No.1 : PLATING LAYER OF SILVER COLORED METAL  
PART NAME No.2 : BASE MATERIAL OF SILVER COLORED METAL  
PART NAME No.3 : BLACK EPOXY

Test Item(s)	Unit	Method	MDL	Result		
				No.1	No.2	No.3
Cadmium (Cd)	mg/kg	IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---	---
	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	---	n.d.	n.d.
Lead (Pb)	mg/kg	IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES.	2	86	---	---
	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	---	14	n.d.
Mercury (Hg)	mg/kg	IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---	---
	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	---	n.d.	n.d.
Hexavalent Chromium Cr(VI)	**	With reference to IEC 62321: 2008 and performed by Boiling water extraction Method.#	#	Negative	Negative	---
	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	---	---	n.d.
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS.	10	---	---	n.d.
PFOA (CAS No.: 335-67-1)	mg/kg	With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS.	10	---	---	n.d.

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Test Item(s)	Unit	Method	MDL	Result		
				No.1	No.2	No.3
Tetrabromobisphenol A (TBBP-A) (CAS No.: 79-94-7)	mg/kg	With reference to DIN 53313. Analysis was performed by GC/MS.	10	---	---	n.d.
Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4)	mg/kg	With reference to US EPA 3540C method. Analysis was performed by GC/MS.	5	---	---	n.d.
<b>Sum of PBBs</b>	mg/kg	With reference to IEC 62321: 2008 and performed by GC/MS.	-	---	---	n.d.
Monobromobiphenyl			5	---	---	n.d.
Dibromobiphenyl			5	---	---	n.d.
Tribromobiphenyl			5	---	---	n.d.
Tetrabromobiphenyl			5	---	---	n.d.
Pentabromobiphenyl			5	---	---	n.d.
Hexabromobiphenyl			5	---	---	n.d.
Heptabromobiphenyl			5	---	---	n.d.
Octabromobiphenyl			5	---	---	n.d.
Nonabromobiphenyl			5	---	---	n.d.
Decabromobiphenyl			5	---	---	n.d.
<b>Sum of PBDEs</b>			-	---	---	n.d.
Monobromodiphenyl ether			5	---	---	n.d.
Dibromodiphenyl ether			5	---	---	n.d.
Tribromodiphenyl ether			5	---	---	n.d.
Tetrabromodiphenyl ether			5	---	---	n.d.
Pentabromodiphenyl ether			5	---	---	n.d.
Hexabromodiphenyl ether			5	---	---	n.d.
Heptabromodiphenyl ether			5	---	---	n.d.
Octabromodiphenyl ether			5	---	---	n.d.
Nonabromodiphenyl ether			5	---	---	n.d.
Decabromodiphenyl ether			5	---	---	n.d.

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Test Item(s)	Unit	Method	MDL	Result		
				No.1	No.2	No.3
<b>Polynuclear Aromatic Hydrocarbons (PAHs)</b>						
Acenaphthene (CAS No.: 83-32-9)	mg/kg	With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	---	---	n.d.
Acenaphthylene (CAS No.: 208-96-8)			0.2	---	---	n.d.
Anthracene (CAS No.: 120-12-7)			0.2	---	---	n.d.
Benzo[a]anthracene (CAS No.: 56-55-3)			0.2	---	---	n.d.
Benzo[a]pyrene (CAS No.: 50-32-8)			0.2	---	---	n.d.
Benzo[b]fluoranthene (CAS No.: 205-99-2)			0.2	---	---	n.d.
Benzo[g,h,i]perylene (CAS No.: 191-24-2)			0.2	---	---	n.d.
Benzo[k]fluoranthene (CAS No.: 207-08-9)			0.2	---	---	n.d.
Chrysene (CAS No.: 218-01-9)			0.2	---	---	n.d.
Dibenzo[a,h]anthracene (CAS No.: 53-70-3)			0.2	---	---	n.d.
Fluoranthene (CAS No.: 206-44-0)			0.2	---	---	n.d.
Fluorene (CAS No.: 86-73-7)			0.2	---	---	n.d.
Indeno[1,2,3-c,d] pyrene (CAS No.: 193-39-5)			0.2	---	---	n.d.
Naphthalene (CAS No.: 91-20-3)			0.2	---	---	n.d.
Phenanthrene (CAS No.: 85-01-8)			0.2	---	---	n.d.
Pyrene (CAS No.: 129-00-0)			0.2	---	---	n.d.
<b>Sum of 16 PAHs</b>			-	---	---	n.d.

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Test Item(s)	Unit	Method	MDL	Result		
				No.1	No.2	No.3
BBP (Benzyl butyl phthalate) (CAS No.: 85-68-7)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	---	---	n.d.
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	---	---	n.d.
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.01	---	---	n.d.
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.01	---	---	n.d.
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	---	---	n.d.
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	---	---	n.d.

**Note :**

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated
5. " --- " = Not Conducted
6. \*\* = Qualitative analysis (No Unit)
7. # = a. Positive means the presence of CrVI on the tested areas  
b. Negative means the absence of CrVI on the tested areas

The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> tested areas.

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**Reference information for PAHs:**

**Requirement of ZEK 01.2-08 : Restraining maximum values for products**

Parameter	Category 1	Category 2	Category 3
	Material indented to be put in the mouth or toys for children aged < 36 months with intended skin contact.	Materials not falling under category 1 with foreseeable contact to skin for longer than 30 seconds (long-term skin contact).	Materials not falling under category 1 or 2 with foreseeable contact to skin for less than 30 seconds (short-term skin contact).
Benzo[a]pyrene (mg/kg)	<MDL (<0.2)**	1	20
Sum of 16 EPA-PAH (mg/kg)*	<MDL (<0.2)**	10	200

**Remark :**

\* = Only PAH substances >0.2 mg/kg are taken into account while calculating the sum of PAHs  
 \*\* = If the limits of category 1 are surpassed but the limits of category 2 still met, the confirmation of suitability of contact with foodstuff or the oral mucosa can be verified by an additional specific migration test of the PAH components according to EN 1186, ff. and § 64 LFBG 80.30-1. The results of the migration test shall be evaluated according to law criteria for foodstuff.

**PFOS Reference Information : Directive 2006/122/EC**

- (1) May not be placed on the market or used as a substance or constituent of preparations in a concentration equal to or higher than 0.005 % by mass.
- (2) May not be placed on the market in semi-finished products or articles, or parts thereof, if the concentration of PFOS is equal to or higher than 0.1 % by mass calculated with reference to the mass of structurally or microstructurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than 1µg/m<sup>2</sup> of the coated material.

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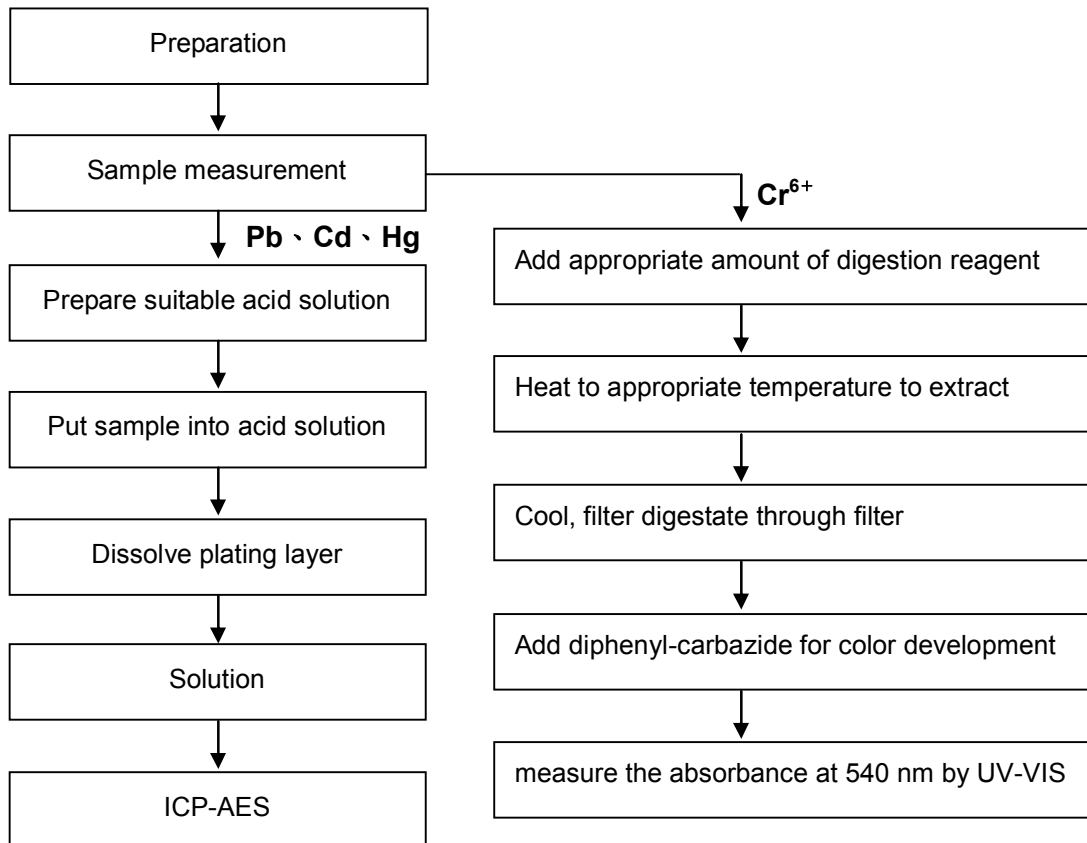
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No.1

- 1) The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang

### Flow Chart of Stripping method for metal analysis



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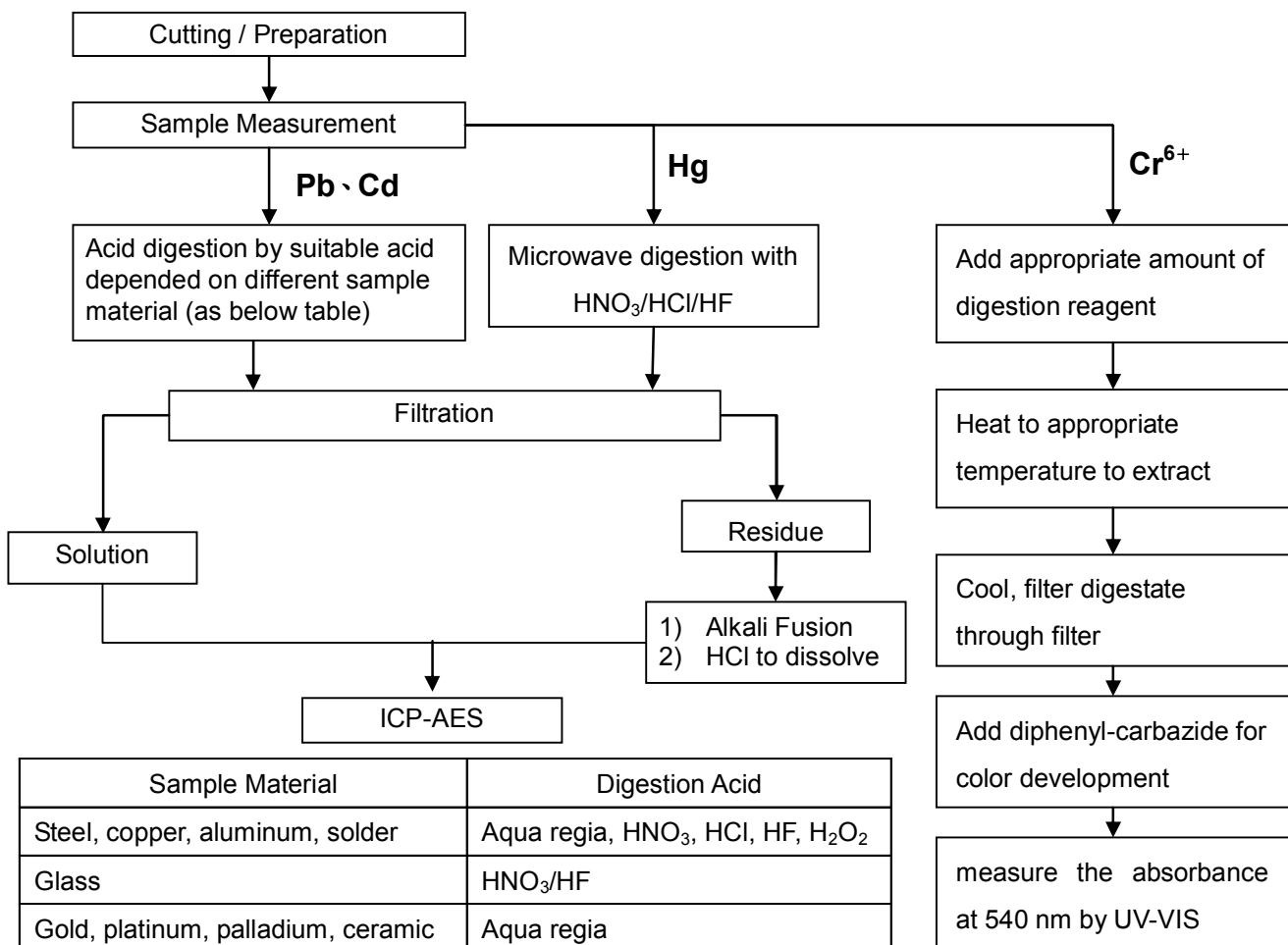
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No.2, No.3

- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.  
(Cr<sup>6+</sup> test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang



Sample Material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
Glass	HNO <sub>3</sub> /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO <sub>3</sub>
Plastic	H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl
Others	Any acid to total digestion

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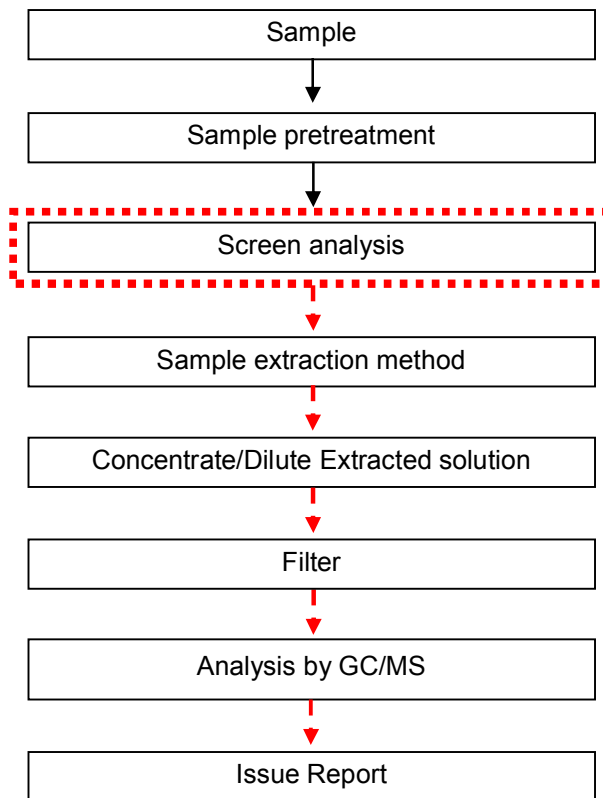


### Analytical flow chart

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang

### 【 Test Items: PBB/PBDE, TBBP-A-bis 】

First testing process —> Optional screen process ..... Confirmation process - ->



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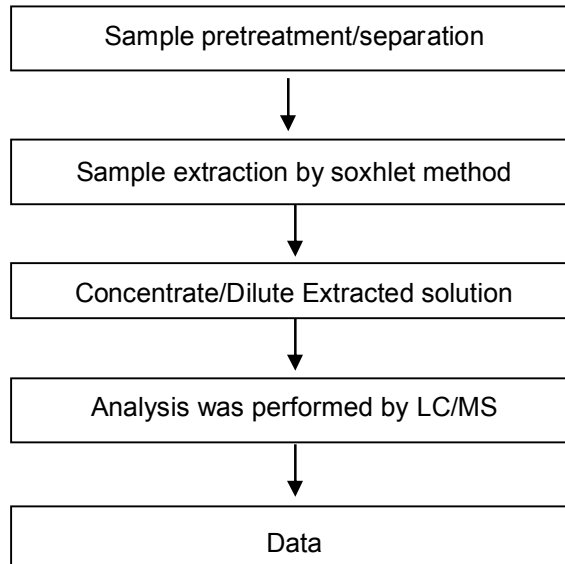
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COUNTY OF NEW CASTLE



### Analytical flow chart of Soxhlet extraction (LC/MS) procedure

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang

#### 【 Test Items: PFOS/PFOA 、 Benzotriazole 】



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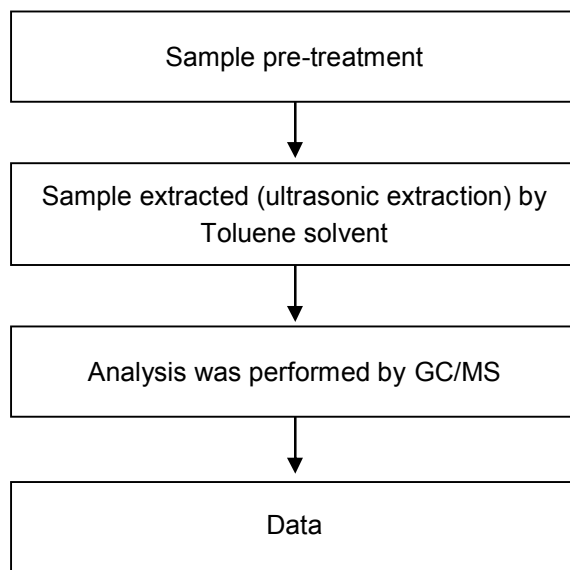
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### PAHs (Polynuclear Aromatic Hydrocarbons) analytical flow chart

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang



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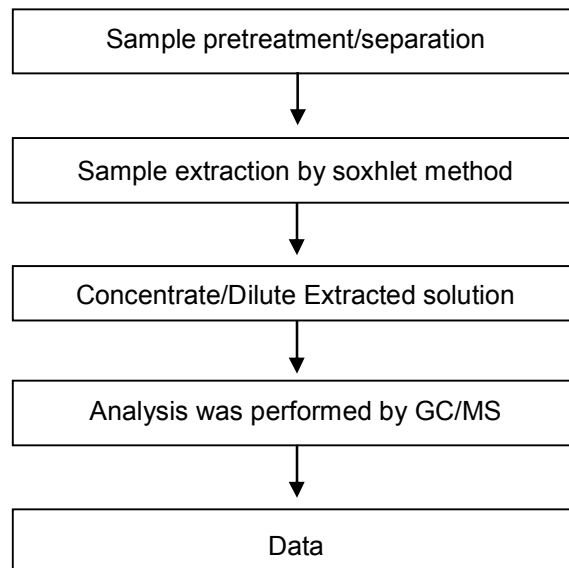
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### Analytical flow chart of Soxhlet extraction (GC/MS) procedure

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang

### 【Test Items: Phthalate、Benzotriazole、HBCDD、NP、DBBT、 Organic phosphorus compounds】



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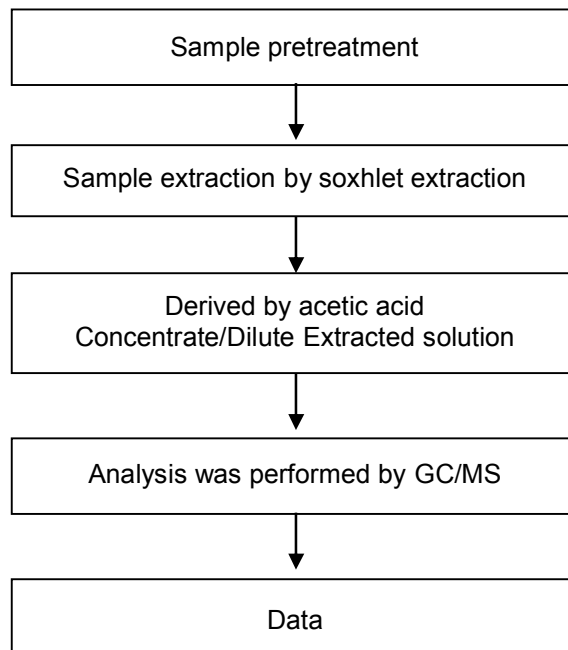
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### Analytical flow chart

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang

#### 【 Test Items: TBBP-A 、 Bisphenol A 】



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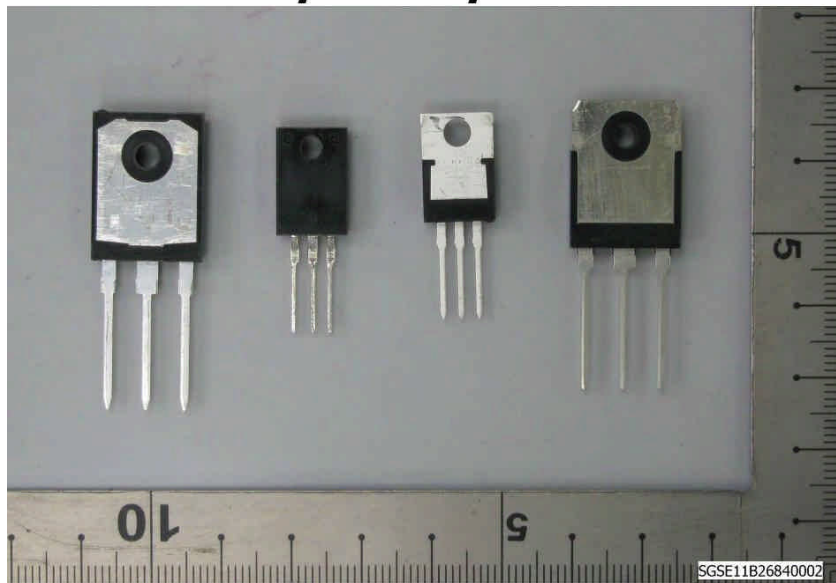
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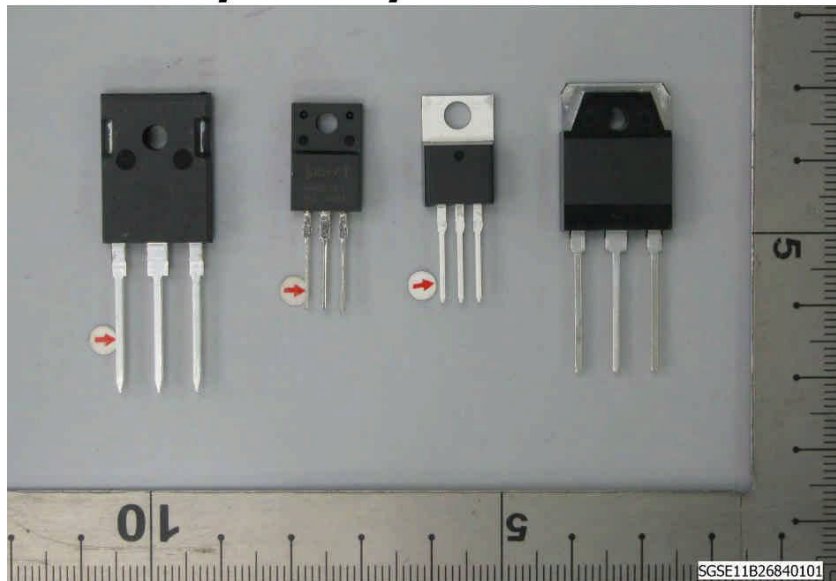


\* The tested sample / part is marked by an arrow if it's shown on the photo. \*

### CE/2011/B2684



### CE/2011/B2684 NO.1



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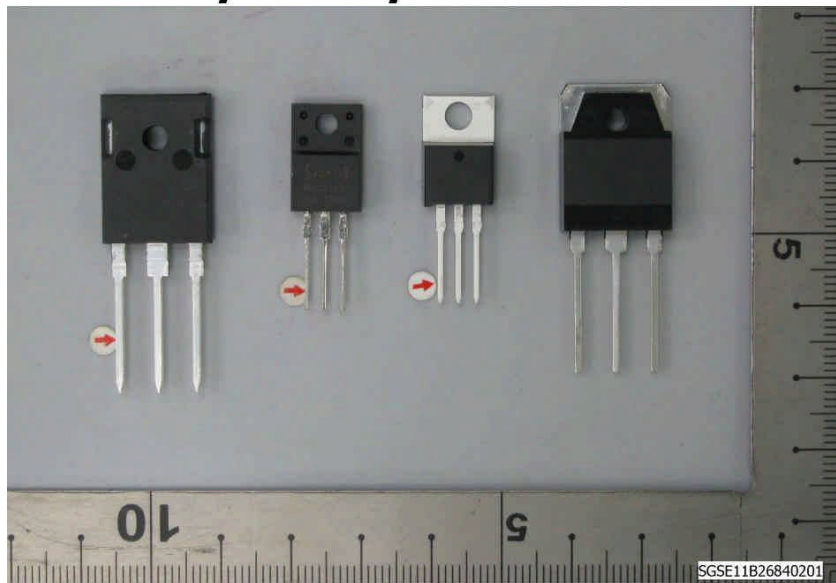
## Test Report

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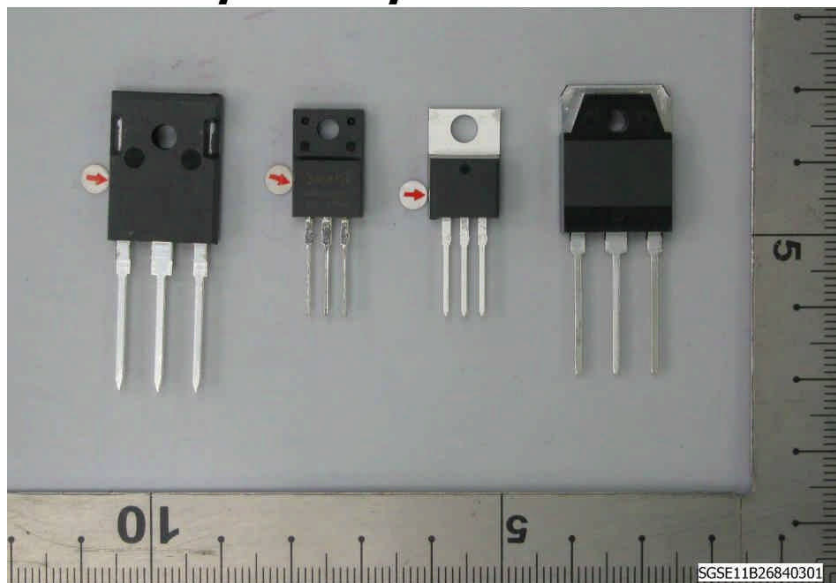
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### CE/2011/B2684 NO.2



### CE/2011/B2684 NO.3



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

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