

## 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. : TO-126C, TO-126FC  
Sample Receiving Date : 2012/05/15  
Testing Period : 2012/05/15 TO 2012/05/24

=====  
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 01.4-08 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	68	---	---
	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	---	74	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 3550C: 2007. Analysis was performed by LC/MS.	10	---	---	n.d.
PFOA (CAS No.: 335-67-1)	mg/kg	With reference to US EPA 3550C: 2007. 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.
Dimethyl Fumarate (CAS No.: 624-49-7)	mg/kg	With reference to US EPA 3550C method. Analysis was performed by GC/MS.	0.1	---	---	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 01.4-08 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.
Benzo[j]fluoranthene (CAS No.: 205-82-3)			0.2	---	---	n.d.
Benzo[e]pyrene (CAS No.: 192-97-2)			0.2	---	---	n.d.
<b>Sum of 18 PAHs</b>			-	---	---	n.d.

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**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

**PFOS Reference Information : POPs - (EU) 757/2010**

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1µg/m<sup>2</sup>.

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## Reference information for PAHs:

### Requirement of ZEK 01.4-08 : 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 18 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.

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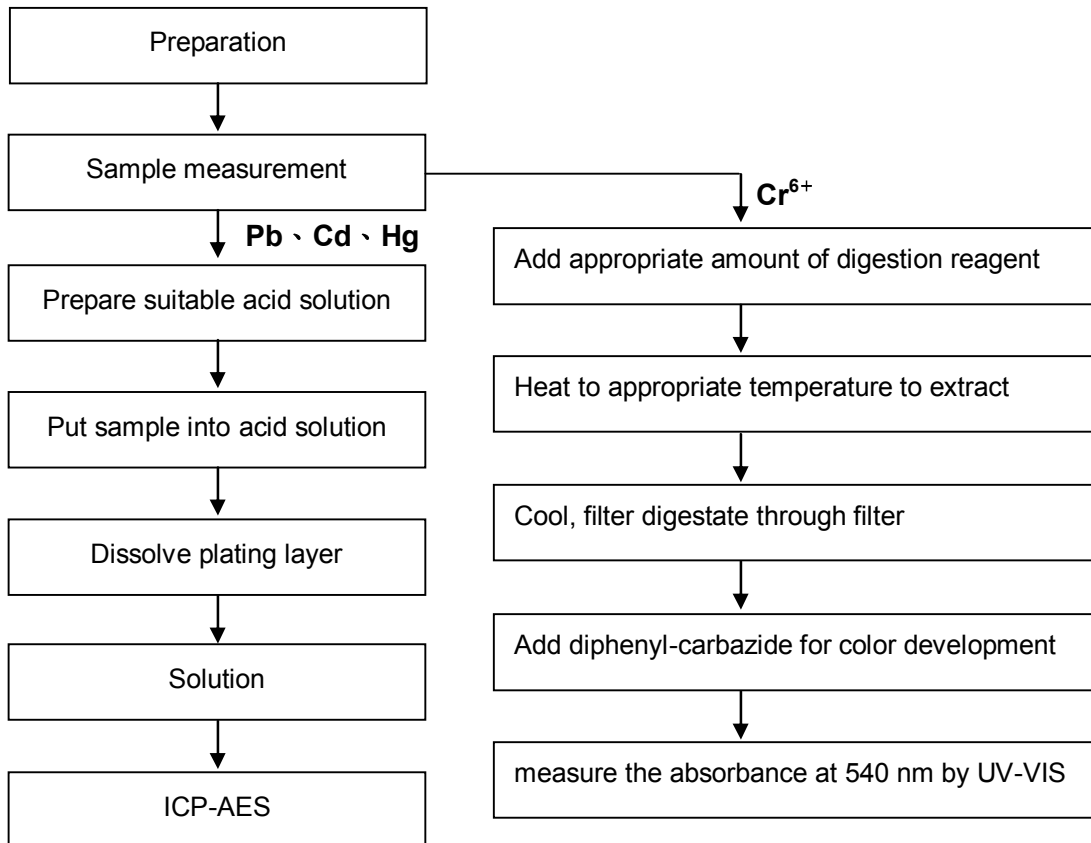
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PART NAME No.1

- 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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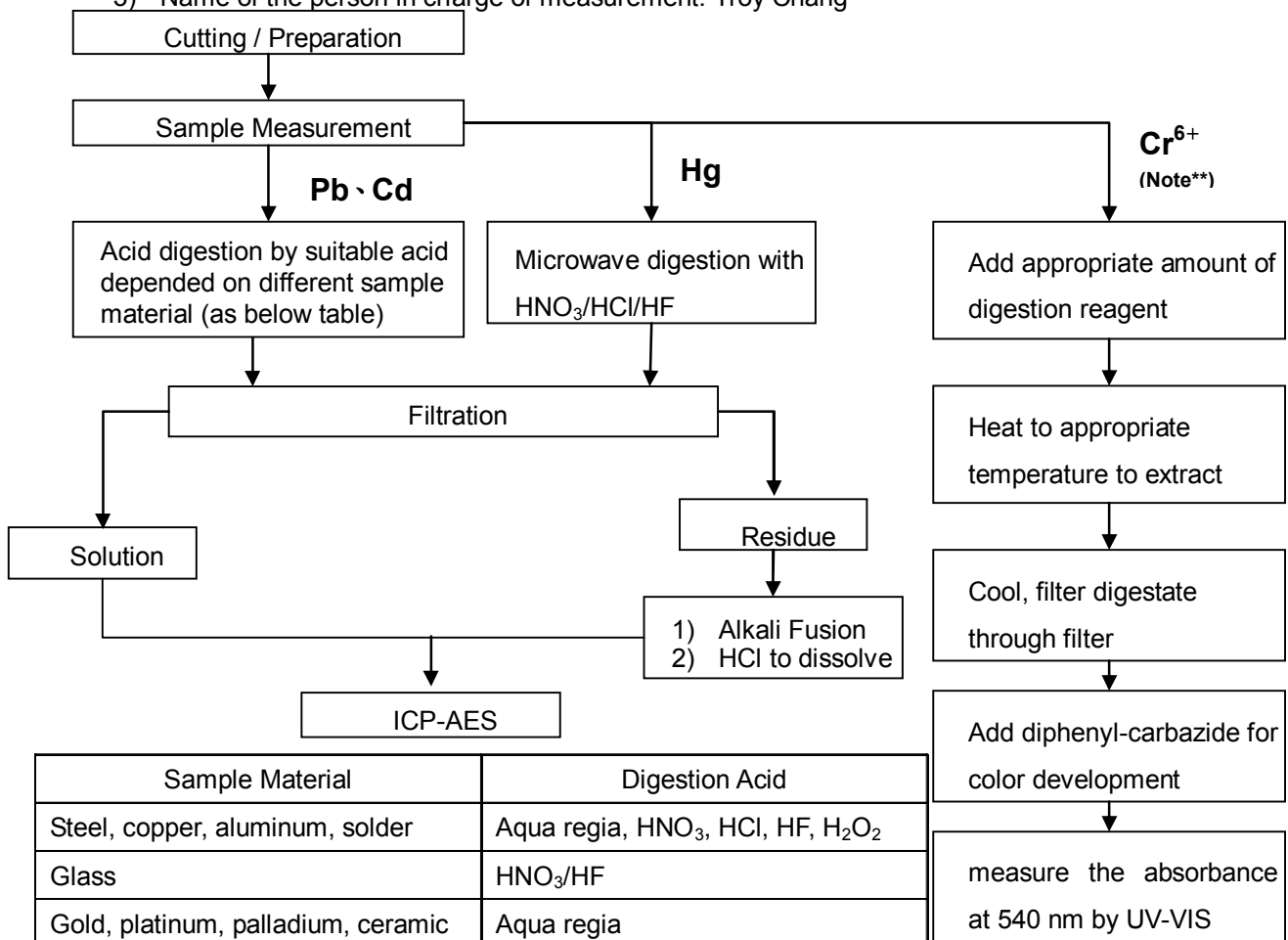
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PART NAME No.2, 3

- 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	Added appropriate reagent to total digestion

**Note\*\* :** (1) For non-metallic material, add alkaline digestion reagent and heat to 90~95°C.  
(2) For metallic material, add pure water and heat to boiling.

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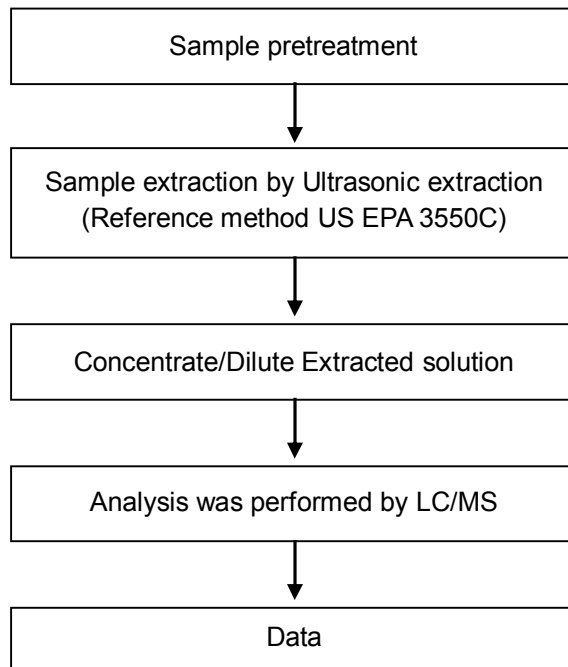
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## Analytical flow chart of Ultrasonic extraction (LC/MS) procedure

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

### ■ Test Items: PFOA/PFOS 、 Bisphenol A 、 NP 、 OP



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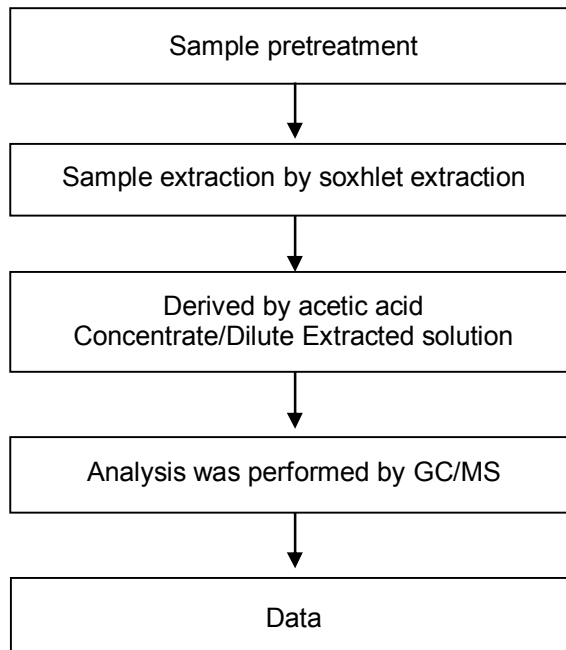
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### TBBP-A analytical flow chart

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



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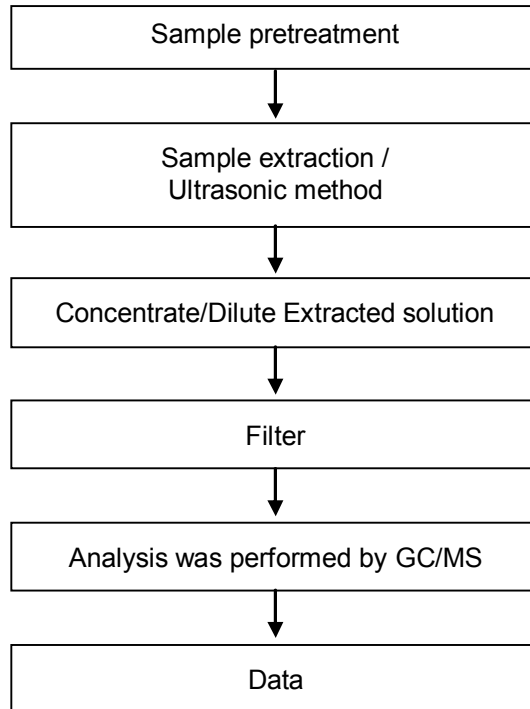
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### Analytical flow chart of Ultrasonic extraction (GC/MS) procedure

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

**【Test Items: HBCDD、Dimethyl Fumarate、PAHs、Ethylene glycol ether、1-methyl-2-pyrrolidone、AP、NP、OP】**



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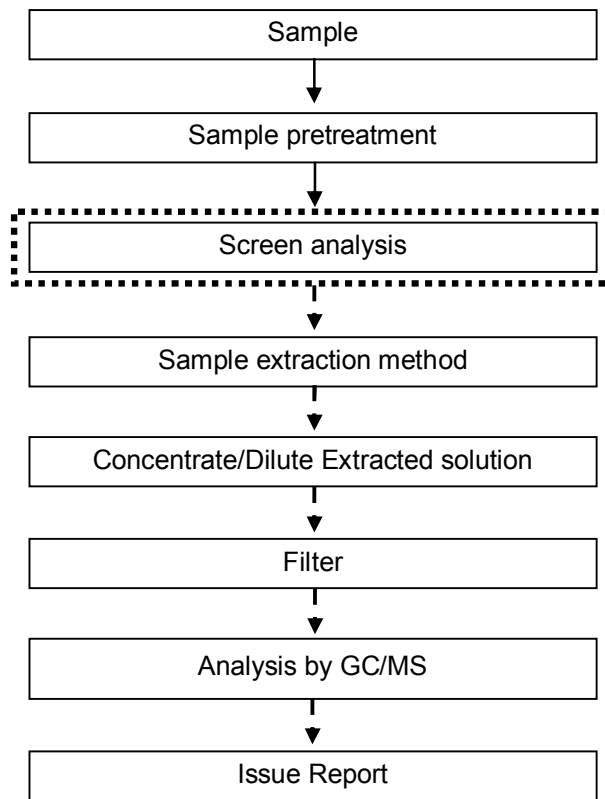


### Analytical flow chart

- 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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## Test Report

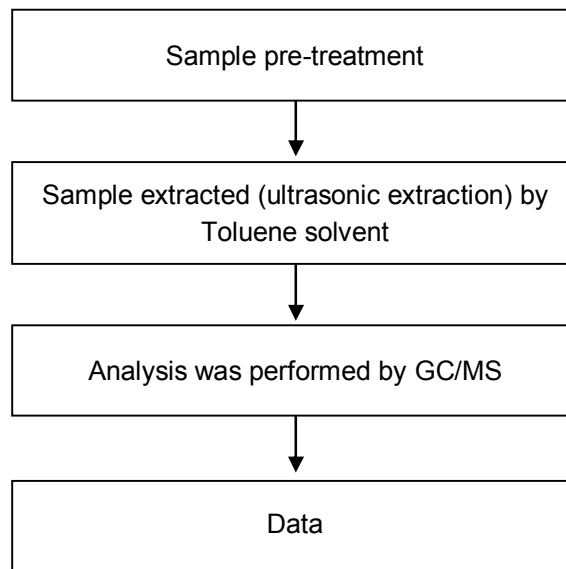
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### PAHs (Polynuclear Aromatic Hydrocarbons) analytical flow chart

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



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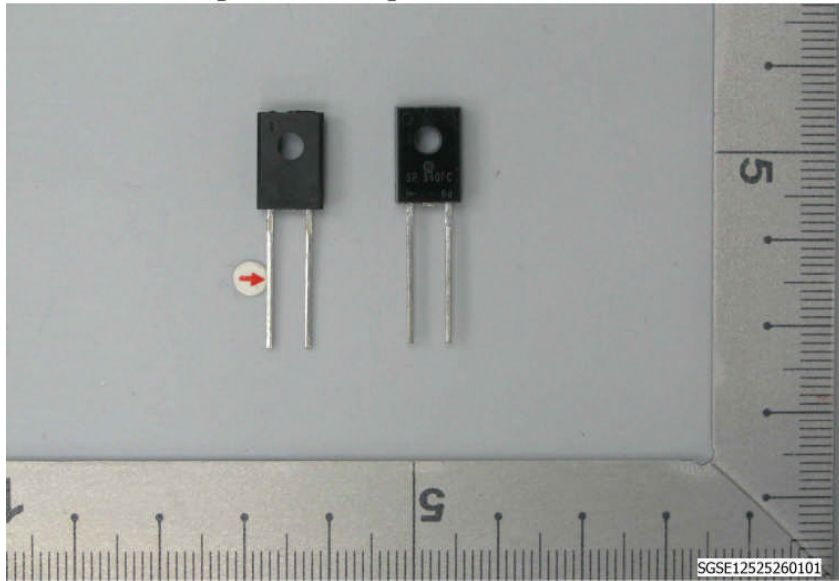
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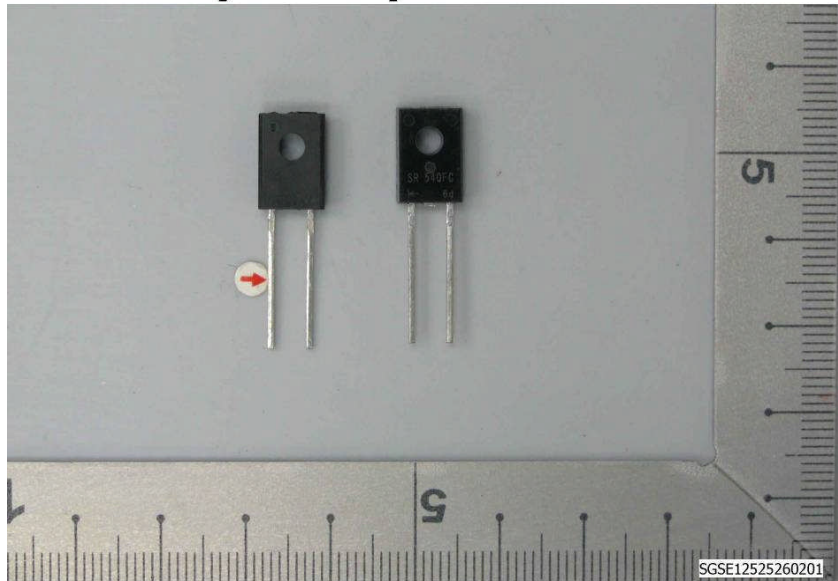


\* The tested sample / part is marked by an arrow if it's shown on the photo. \*

### CE/2012/52526 NO.1



### CE/2012/52526 NO.2



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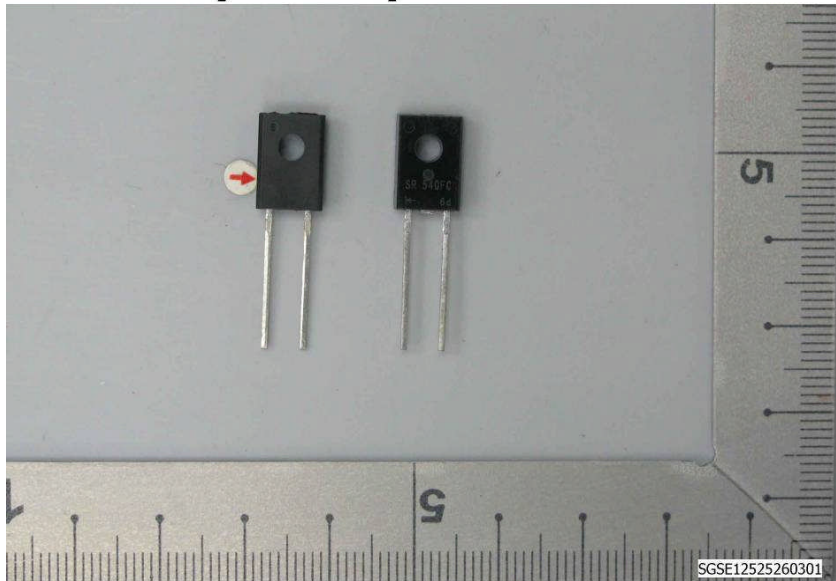
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\*\* End of Report \*\*

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