

Test Report

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MACRONIX INTERNATIONAL CO., LTD.
NO. 8, CREATION ROAD IV, SCIENCE PARK, HSIN-CHU,
TAIWAN, R. O. C.



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

Sample Description : 消費性電子產品 (CONSUMER IC MX & KH)
Style/Item No. : 8SOP / 150 MIL
Sample Receiving Date : 2008/12/18
Testing Period : 2008/12/18 TO 2008/12/25

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

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 : BLACK BODY
PART NAME NO.2 : SILVER METAL PIN (INCLUDING THE PLATING LAYER)

Test Item (s):	Unit	Method	MDL	Result	
				No.1	No.2
Cadmium (Cd)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.	n.d.
Lead (Pb)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.	17
Mercury (Hg)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.	n.d.
Hexavalent Chromium Cr(VI) by alkaline extraction	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.	---
Hexavalent Chromium Cr(VI) by Spot test / boiling water extraction	**	With reference to IEC 62321: 2008 and performed by Spot test / boiling water extraction Method. (See Note 5)	0.02mg/kg with 50 cm ² surface area	---	Negative
Perfluorooctane sulfonates (PFOS) PFOS – Acid PFOS – Metal Salt PFOS – Amide	mg/kg	With reference to US EPA 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS.	10	n.d.	---
Halogen					
Halogen-Fluorine (F) (CAS No.: 014762-94-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	---
Halogen-Chlorine (Cl) (CAS No.: 022537-15-1)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	---
Halogen-Bromine (Br) (CAS No.: 010097-32-2)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	---
Halogen-Iodine (I) (CAS No.: 014362-44-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	---

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Test Item (s):	Unit	Method	MDL	Result			
				No.1	No.2		
Sum of PBBs	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.	---		
Sum of PBDEs					-	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.	---

Note : 1. mg/kg = ppm ; 0.1wt% = 1000ppm

2. n.d. = Not Detected

3. MDL = Method Detection Limit

4. " - " = Not Regulated

5. Spot-test:

Negative = Absence of Cr(VI) coating / surface layer,

Positive = Presence of Cr(VI) coating / surface layer;

(The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed.)

Boiling-water-extraction:

Negative = Absence of Cr(VI) coating / surface layer.

Positive = Presence of Cr(VI) coating / surface layer;

the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.

6. "---" = Not Conducted

7. ** = Qualitative analysis (No Unit)

8. The sample(s) was/were analyzed on behalf of the applicant as mixing sample in one testing.

The above result(s) was/were only given as the informality value.

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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 $1\mu\text{g}/\text{m}^2$ of the coated material.

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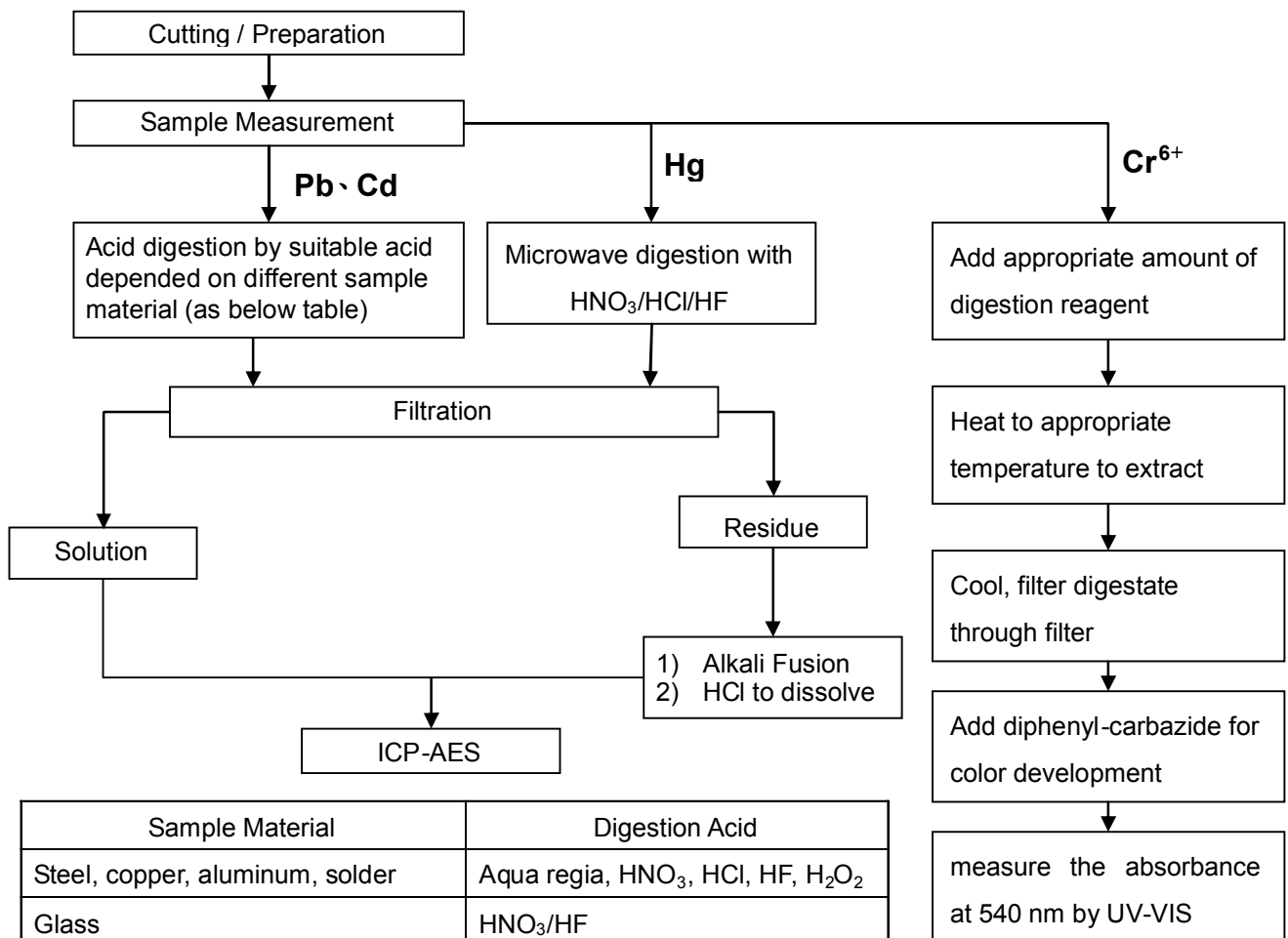
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- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.
(Cr⁶⁺ test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang



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

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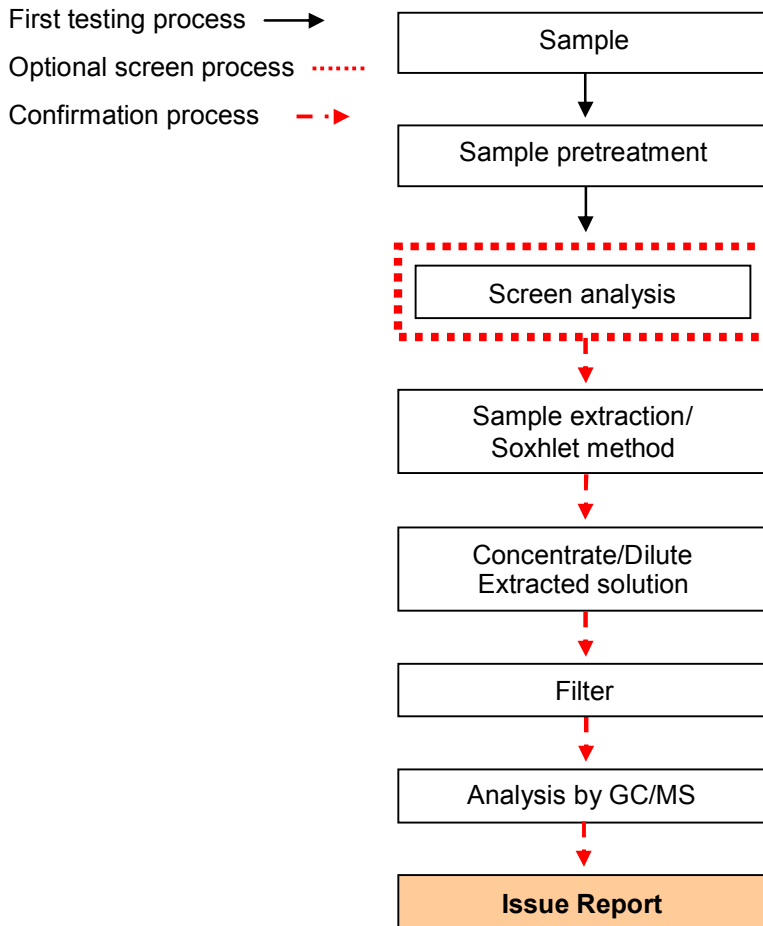
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MACRONIX INTERNATIONAL CO., LTD.
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PBB/PBDE analytical FLOW CHART

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



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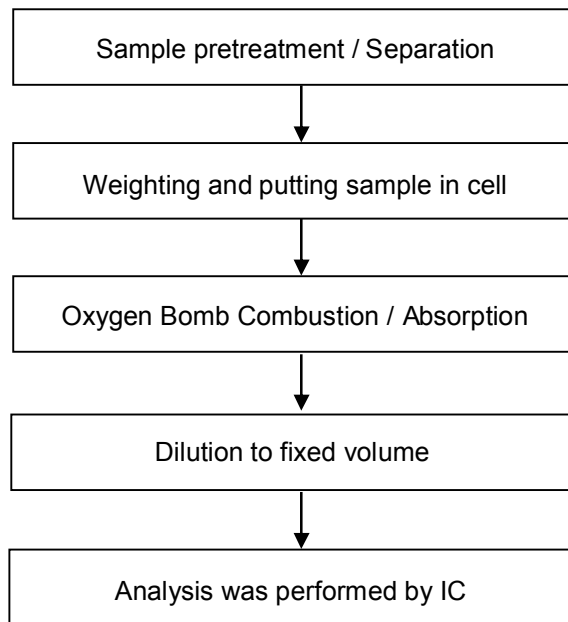
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Analytical flow chart of halogen content

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



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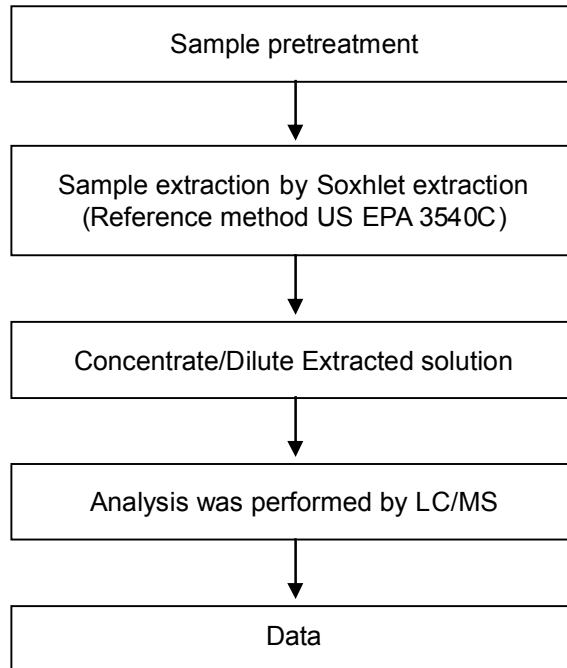
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Analytical flow chart of PFOA/PFOS content

- 1) Name of the person who made measurement: Carrie Liu
- 2) Name of the person in charge of measurement: Shinjyh Chen



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** End of Report **

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