

## Test Report

No. : CE/2020/24425R

Date : 2020/02/21

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HITACHI CHEMICAL CO., LTD.

14, GOIMINAMIKAIGAN, ICHIHARA-SHI, CHIBA, 290-8567, JAPAN

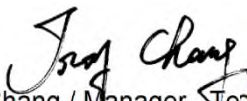
The following samples was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By : HITACHI CHEMICAL CO., LTD.  
Sample Description : DIE ATTACH FILM  
Style/Item No. : HR-5104 SERIES  
Sample Receiving Date : 2020/02/18  
Testing Period : 2020/02/18 to 2020/02/21

### Test Requested :

- (1) As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs contents in the submitted sample(s).
- (2) Please refer to next pages for the other item(s).

Test Result(s) : Please refer to following pages.

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



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## Test Result(s)

PART NAME No.1 : WHITE FILM (EXCLUDING THE DOUBLE RELEASE FILM)

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

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Test Item(s)	Unit	Method	MDL	Result
				No.1
<b>Halogen</b>				
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	138
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.
Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.
Antimony (Sb)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	n.d.
Antimony trioxide (Sb <sub>2</sub> O <sub>3</sub> ) (CAS No.: 1309-64-4)	mg/kg	Calculated from the result of Antimony.	2 (▲)	n.d.

**Note :**

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected = less than MDL
4. " - " = Not Regulated
5. (▲) : The MDL was evaluated for element / tested substance.

Conversion Formula :  $AX = A \times F$

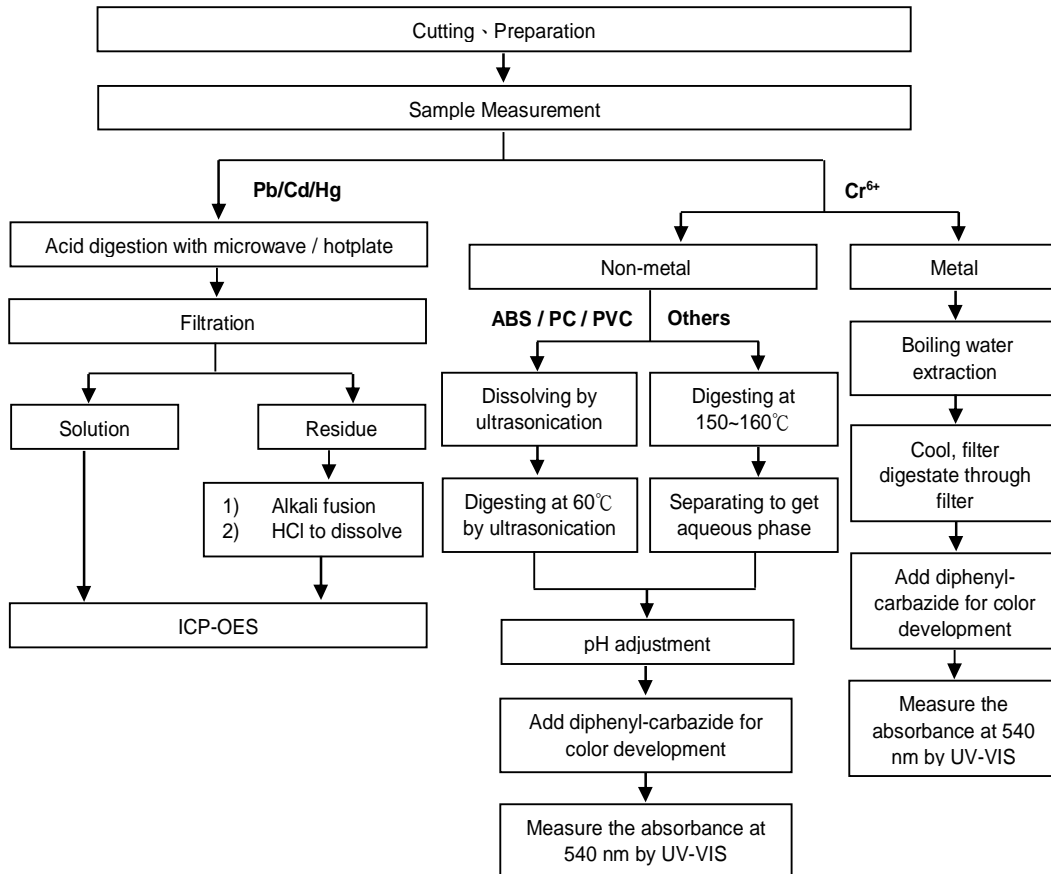
AX	A	F
Antimony trioxide (Sb <sub>2</sub> O <sub>3</sub> )	Antimony	1.1971

Parameter Conversion Table : [http://twap.sgs.com/sgsrsts/chn/download-REACH\\_tw.asp](http://twap.sgs.com/sgsrsts/chn/download-REACH_tw.asp)

## Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)

- Technician : Rita Chen
- Supervisor: Troy Chang



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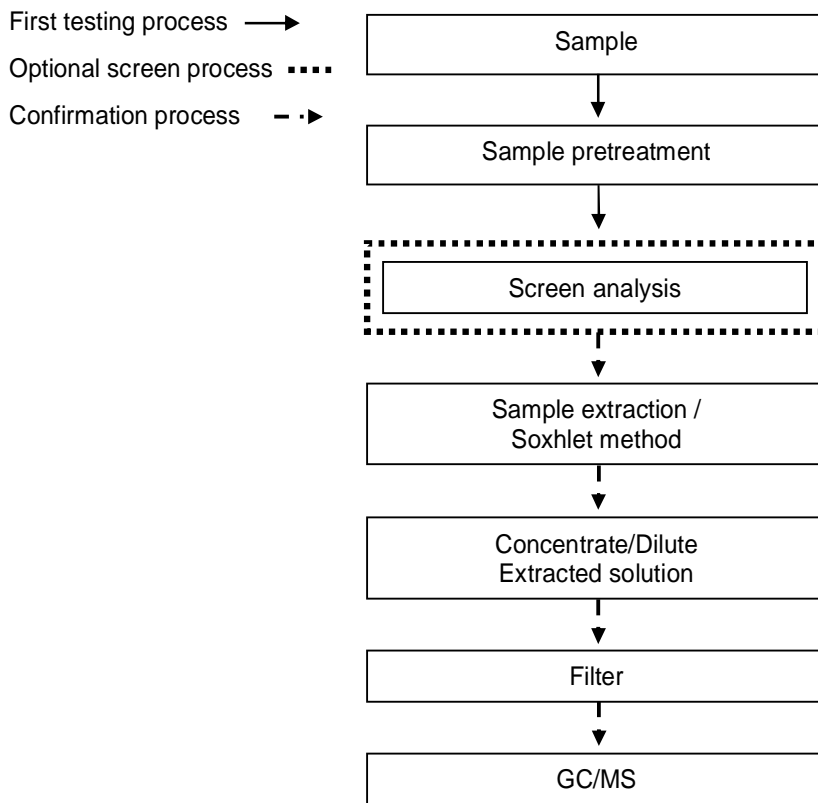
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### Analytical flow chart – PBB / PBDE

- Technician : Yaling Tu
- Supervisor: Troy Chang



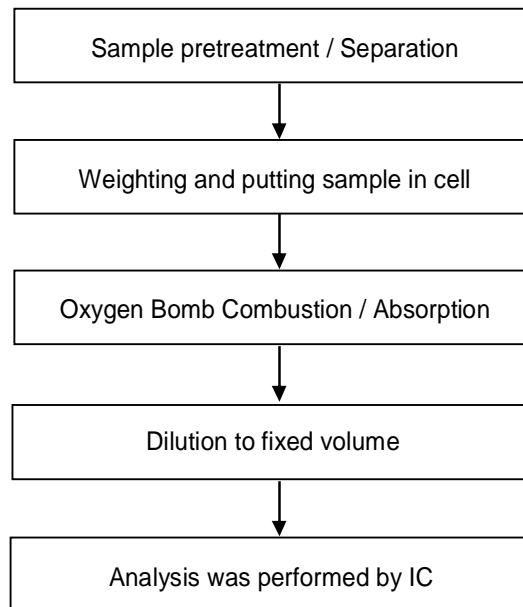
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### Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang



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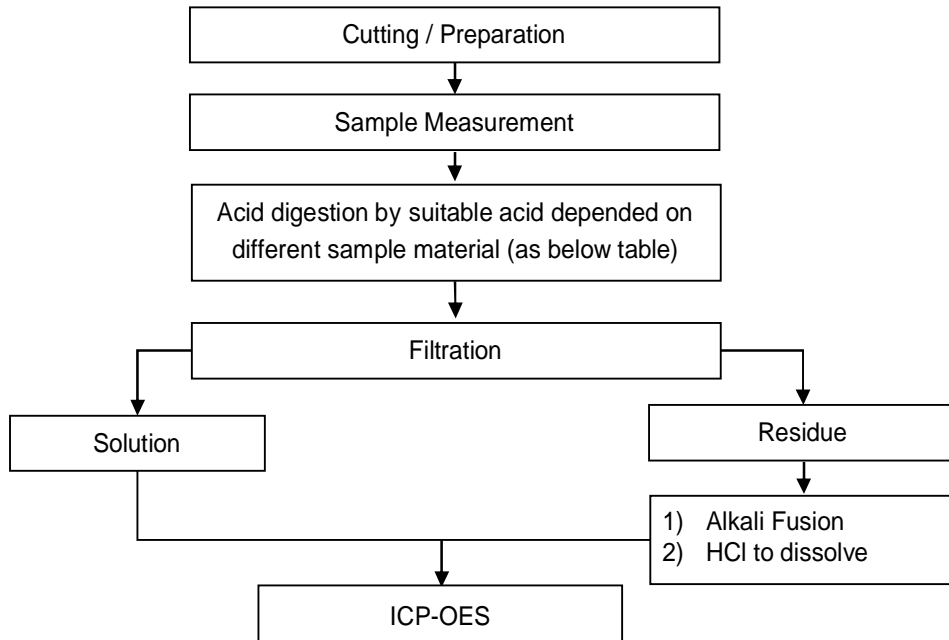
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These samples were dissolved totally by pre-conditioning method according to below flow chart.

- Technician: Rita Chen
- Supervisor: Troy Chang

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



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

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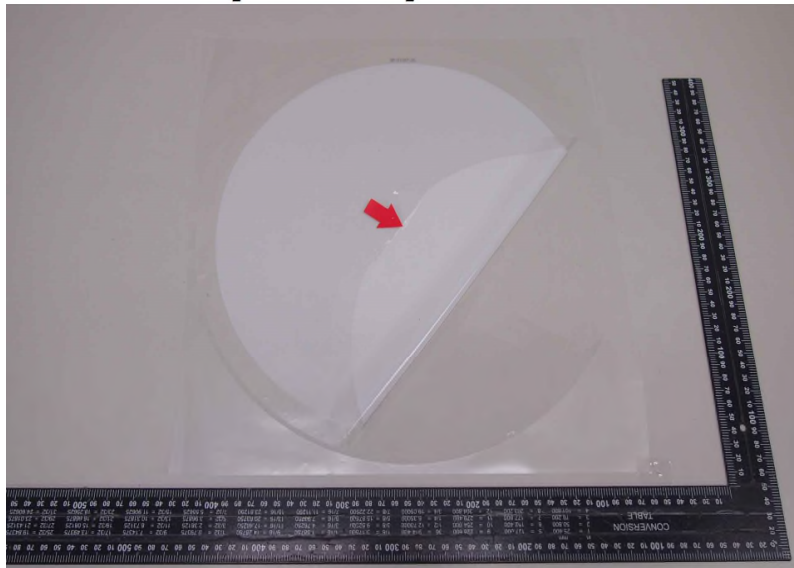
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\* The tested sample / part is marked by an arrow if it's shown on the photo. \*

## CE/2020/24425



\*\* End of Report \*\*

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