# Test Report

No. : CE/2016/43916 Date : 2016/04/22



MITSUI CHEMICALS TOHCELLO, INC.
7, KANDA MITOSHIRO-CHO, CHIYODA-KU, TOKYO 101-8485 JAPAN

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

| | | |
|---|---|---|
| Sample Description | : | OPULENT SINGLE-LAYERED FILM (TPX FILM) |
| Style/Item No. | : | X-99BR |
| Sample Receiving Date | : | 2016/04/20 |
| Testing Period | : | 2016/04/20 TO 2016/04/22 |

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**Test Requested** :

(1) 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.

(2) Please refer to next pages for the other item(s).

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

SGS TAIWAN LTD SGS TAIWAN

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

MITSUI CHEMICALS TOHCELLO, INC.
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**Test Result(s)**

PART NAME No.1 : TRANSPARENT PLASTIC 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-AES. | 2 | n.d. |
| Lead (Pb) | mg/kg | With reference to IEC 62321-5 (2013) and performed by ICP-AES. | 2 | n.d. |
| Mercury (Hg) | mg/kg | With reference to IEC 62321-4 (2013) and performed by ICP-AES. | 2 | n.d. |
| Hexavalent Chromium Cr(VI) | mg/kg | With reference to IEC 62321 (2008) and performed by UV-VIS. | 2 | n.d. |
| Antimony (Sb) | mg/kg | With reference to US EPA 3050B (1996). Analysis was performed by ICP-AES. | 2 | n.d. |
| Phosphorus (P) | mg/kg | With reference to US EPA 3052 (1996). Analysis was performed by ICP-AES. | 2 | n.d. |
| DBP (Dibutyl phthalate) (CAS No.: 84-74-2) | mg/kg | With reference to IEC 62321-8/CD (2013). Analysis was performed by GC/MS. | 50 | n.d. |
| BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7) | mg/kg | | 50 | n.d. |
| DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7) | mg/kg | | 50 | n.d. |
| DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1) | mg/kg | | 50 | n.d. |
| DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0) | mg/kg | | 50 | n.d. |
| DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0) | mg/kg | | 50 | n.d. |
| DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5) | mg/kg | | 50 | n.d. |
| DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3) | mg/kg | | 50 | n.d. |

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| Test Item(s) | Unit | Method | MDL | Result No.1 |
|---|---|---|---|---|
| Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD) (CAS No.: 25637-99-4 and 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8)) | mg/kg | With reference to IEC 62321 (2008). Analysis was performed by GC/MS. | 5 | n.d. |
| **Sum of PBBs** | 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. |
| **Sum of PBDEs** | 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 |
| **Halogen** | | | | |
| Halogen-Fluorine (F) (CAS No.: 14762-94-8) | mg/kg | With reference to BS EN 14582 (2007). Analysis was performed by IC. | 50 | n.d. |
| Halogen-Chlorine (Cl) (CAS No.: 22537-15-1) | mg/kg | | 50 | n.d. |
| 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. |

**Note：**

1. mg/kg = ppm；0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated

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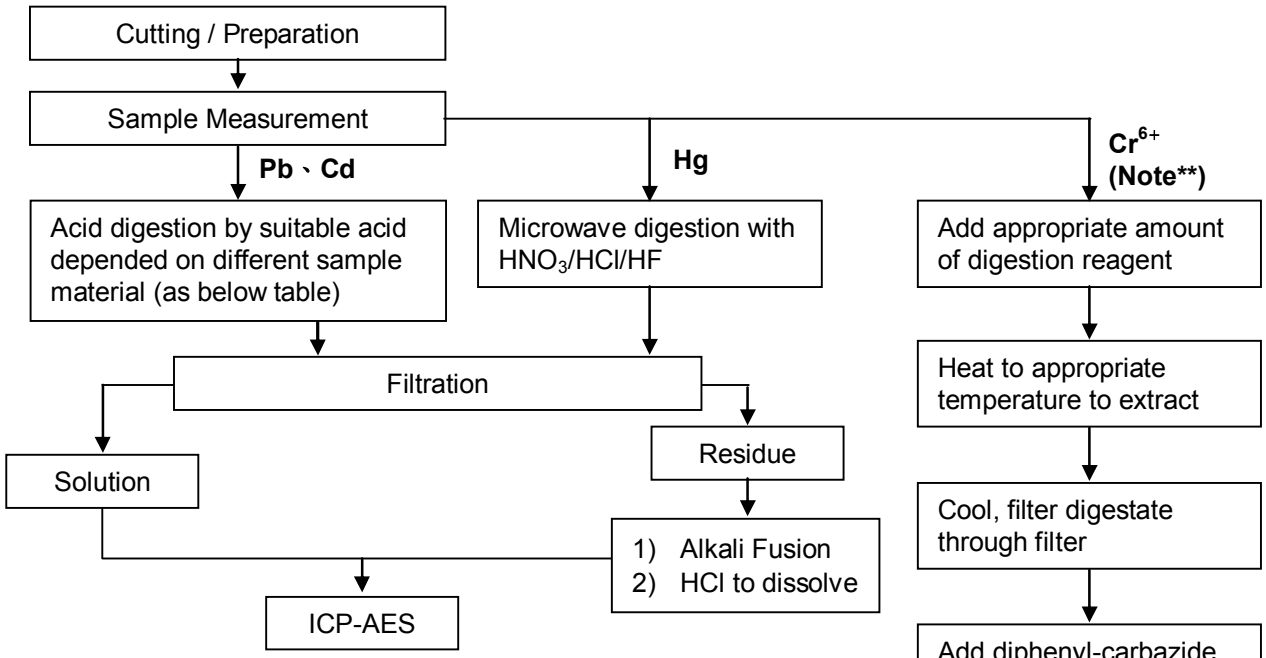
These samples were dissolved totally by pre-conditioning method according to below flow chart.
（$Cr^{6+}$ test method excluded）

- Technician: Climbgreat Yang
- Supervisor: Troy Chang




| Sample Material | Digestion Acid |
|---|---|
| Steel, copper, aluminum, solder | Aqua regia, $HNO_3$, HCl, HF, $H_2O_2$ |
| Glass | $HNO_3$/HF |
| Gold, platinum, palladium, ceramic | Aqua regia |
| Silver | $HNO_3$ |
| Plastic | $H_2SO_4$, $H_2O_2$, $HNO_3$, HCl |
| Others | Added appropriate reagent to total digestion |

**Note** (For IEC 62321)**

(1) For non-metallic material, add alkaline digestion reagent and heat to 90~95℃.
(2) For metallic material, add pure water and heat to boiling.

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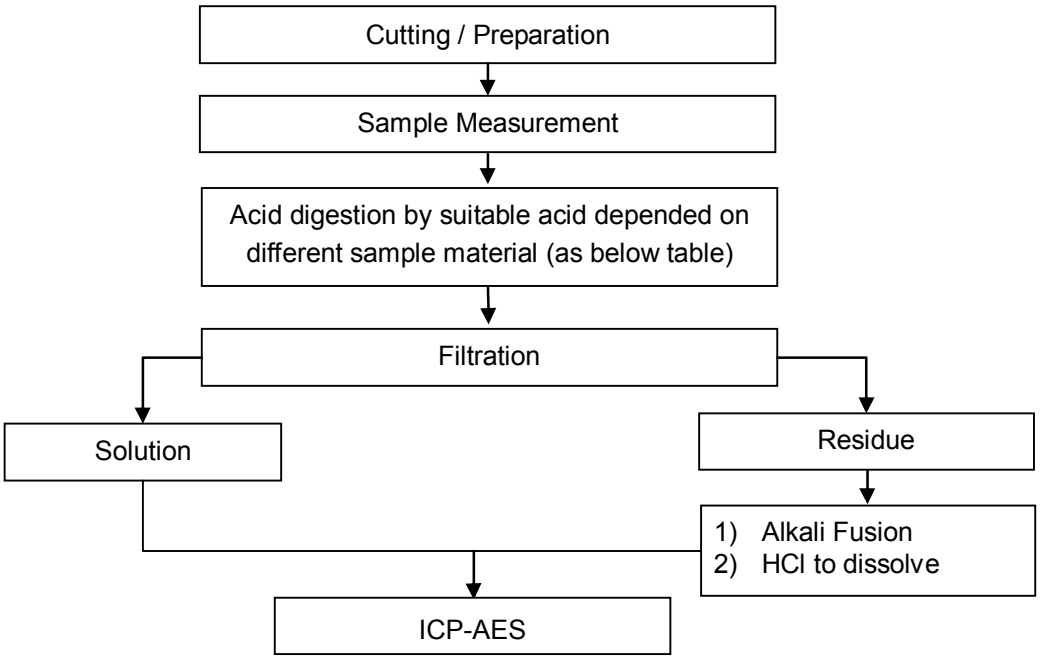
These samples were dissolved totally by pre-conditioning method according to below flow chart.

- Technician: Climbgreat Yang
- Supervisor: Troy Chang

**Flow Chart of digestion for the elements analysis performed by ICP-AES**




| | |
|---|---|
| Steel, copper, aluminum, solder | Aqua regia, $HNO_3$, HCl, HF, $H_2O_2$ |
| Glass | $HNO_3$/HF |
| Gold, platinum, palladium, ceramic | Aqua regia |
| Silver | $HNO_3$ |
| Plastic | $H_2SO_4$, $H_2O_2$, $HNO_3$, HCl |
| Others | Added appropriate reagent to total digestion |

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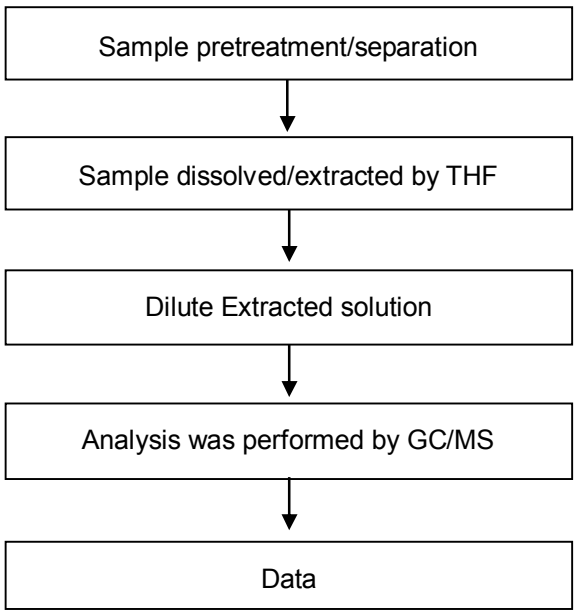
## Analytical flow chart - Phthalate

- Technician: Andy Shu
- Supervisor: Troy Chang

**【Test method: IEC 62321-8】**



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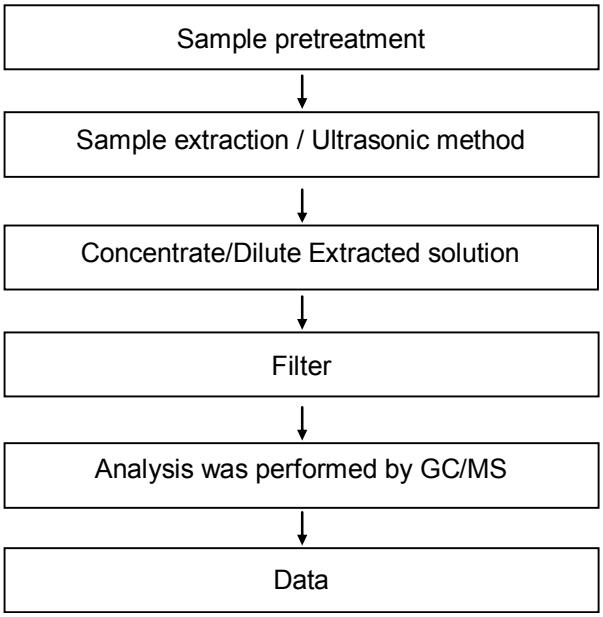
**Analytical flow chart - HBCDD**

- Technician: Roman Wong
- Supervisor: Troy Chang



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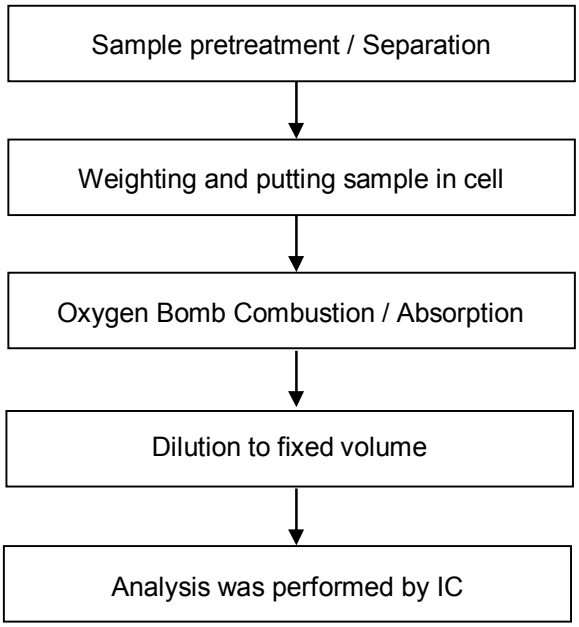
## Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang



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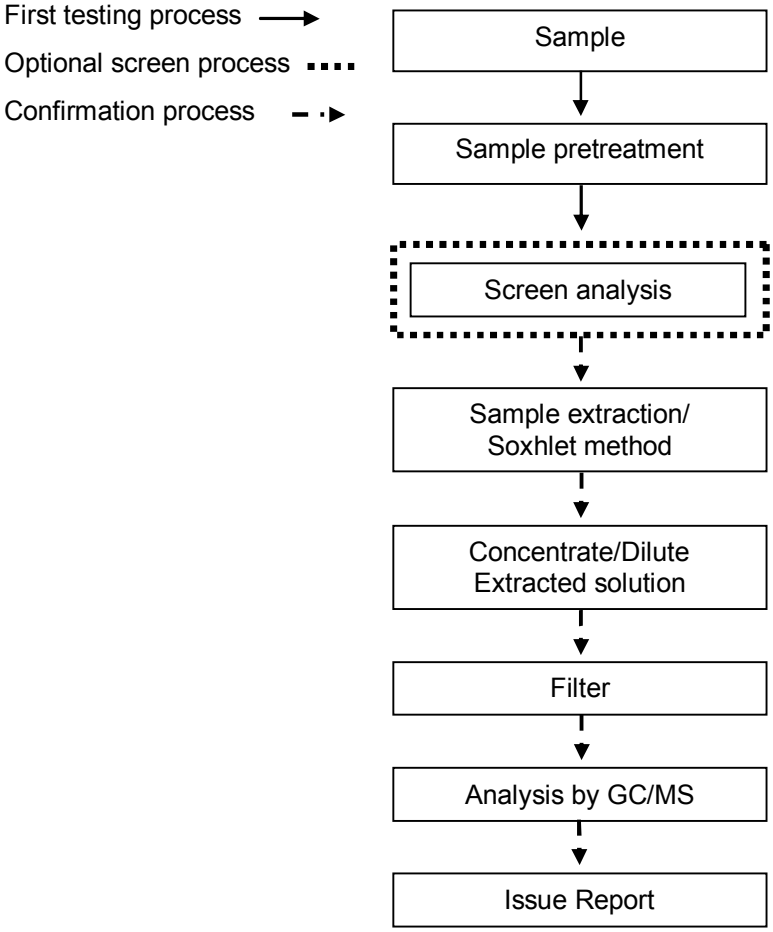
## Analytical flow chart - PBB/PBDE

- Technician : Roman Wong
- Supervisor: Troy Chang



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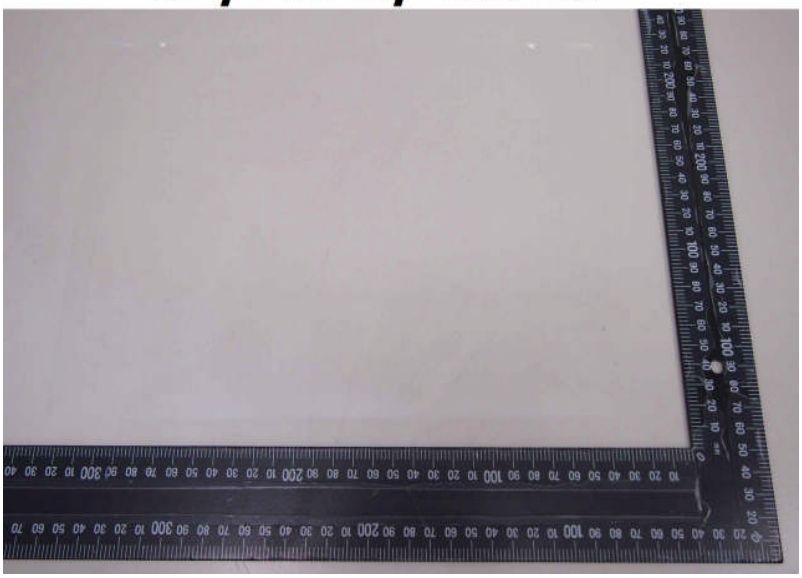
*** The tested sample / part is marked by an arrow if it's shown on the photo. ***

CE/2016/43916



** End of Report **