

## Test Report

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Date : 2019/11/06

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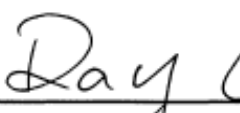

KYOCERA CORPORATION

2-17 MACHIikedai, KORIYAMA, FUKUSHIMA 963-0215, JAPAN

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

Sample Submitted By : KYOCERA CORPORATION  
Sample Description : Epoxy Molding Compounds  
Style/Item No. : KE-G1250series, G2250series  
JP Reference No. : JP/2019/101725  
Sample Receiving Date : 2019/10/31  
Testing Period : 2019/10/31 to 2019/11/06

=====  
**Test Requested** : (1) As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine DBP, BBP, DEHP, DIBP contents in the submitted sample(s).  
(2) Please refer to next pages for the other item(s).  
**Test Result(s)** : Please refer to next page(s).  
**Conclusion** : (1) Based on the performed tests on submitted sample(s), the test results of DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

  
Ray Chang Ph.D. / Manager -  
Signed for and on behalf of  
SGS Taiwan Limited  
Chemical Laboratory-Kao  


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## Test Result(s)

PART NAME NO.1 : Black Colored Epoxy Molding Compounds

Test Item (s)	Unit	Method	MDL	Result	Limit
				No.1	
Polychlorinated Biphenyls (PCBs)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by GC/MS.	0.5	n.d.	-
Polychlorinated Naphthalene (PCNs)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by GC/MS.	5	n.d.	-
Polychlorinated Terphenyls (PCTs)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by GC/MS.	0.5	n.d.	-
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins) (CAS No.:85535-84-8)	%	With reference to US EPA 3550C: 2007. Analysis was performed by GC/ECD.	0.01	n.d.	-
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified ( $\alpha$ - HBCDD, $\beta$ - HBCDD, $\gamma$ - 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.	-
Beryllium (Be)	mg/kg	With reference to US EPA 3052: 1996. Analysis was performed by ICP-OES.	2	n.d.	-
PVC	**	Analysis was performed by FTIR and FLAME Test.	-	Negative	-
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.	-
<b>Organic-tin compounds</b>					-
Tributyl Tin (TBT)	mg/kg	With reference to ISO 17353: 2004. Analysis was performed by GC/FPD.	0.03	n.d.	-
Triphenyl Tin (TphT)	mg/kg		0.03	n.d.	-
Dibutyl Tin (DBT)	mg/kg		0.03	n.d.	-
Diocetyl Tin (DOT)	mg/kg		0.03	n.d.	-
Bis(tributyltin)oxide (TBTO) (CAS No.: 56-35-9)	mg/kg	With reference to ISO 17353: 2004. Analysis was performed by GC/FPD. Calculated from the result of Tributyl Tin (TBT).	0.03 (▲)	n.d.	-

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Test Item (s)	Unit	Method	MDL	Result	Limit
				No.1	
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	1000
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	1000
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	1000
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	1000
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0, 68515-48-0)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0, 68515-49-1)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
DHNUP (1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters) (CAS No.: 68515-42-4)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
DIHP (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7- rich) (CAS No.: 71888-89-6)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
DMEP (Bis (2-methoxyethyl) phthalate) (CAS No.: 117-82-8)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
DNPP(Di-n-pentyl phthalate) (CAS No.: 131-18-0)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	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. \*\* = Qualitative analysis (No Unit)
6. Negative = Undetectable / Positive = Detectable
7. (▲) : The MDL was evaluated for element / tested substance.

Conversion Formula :  $AX = A \times F$

AX	A	F
Bis(tributyltin)oxide (TBTO)	Tributyl Tin (TBT)	1.024

**PFOS Reference Information : POPs - (EU) 2019/1021**

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/m². PFOS refer to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic acid, Perfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamide, N-Ethylperfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamidoethanol and N-Ethylperfluorooctane sulfonamidoethanol.

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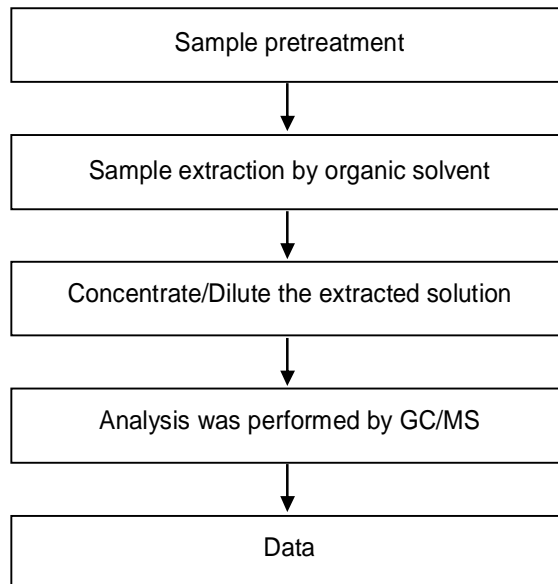
2-17 MACHIikedai, KORIYAMA, FUKUSHIMA 963-0215, JAPAN

### Chlorinated Flame retardant analytical flow chart

- Technician: Dorothy Chen
- Supervisor: Ray Chang

【Reference method: US EPA 3550C】

【Test Items: PCBs, PCNs, PCTs 】



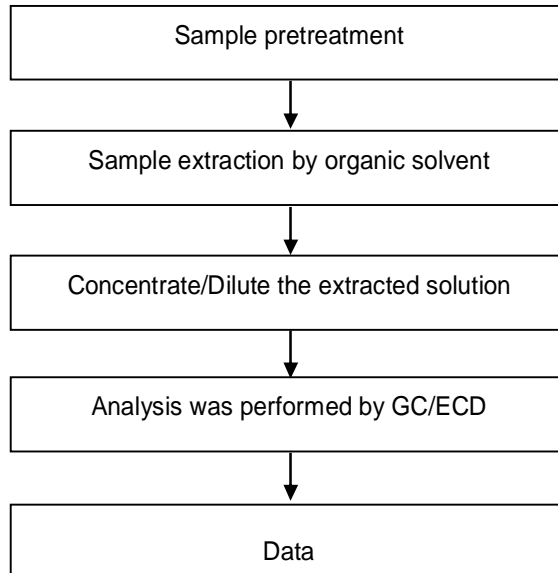
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### Analytical flow chart - Chlorinated Paraffins

- Technician: Dorothy Chen
- Supervisor: Ray Chang

【Reference method: US EPA 3550C】

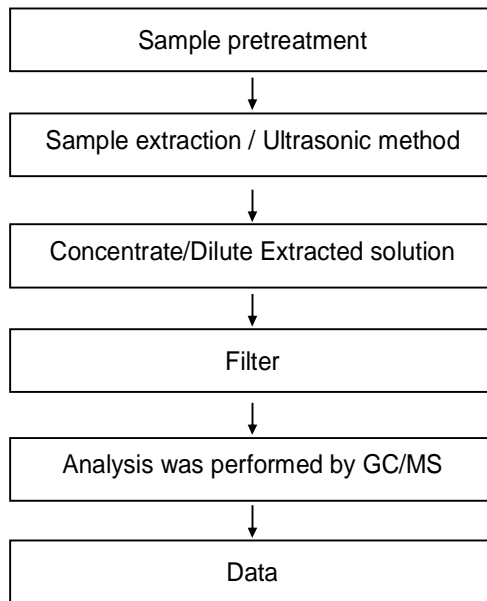


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### HBCDD analytical flow chart

- Technician : Dorothy Chen
- Supervisor: Ray Chang



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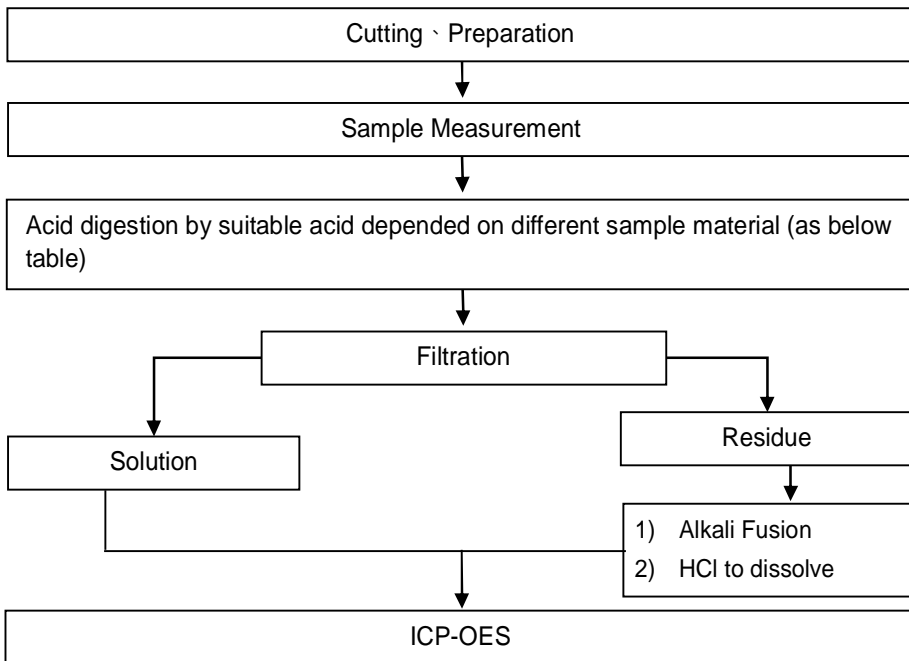
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## Flow Chart of digestion for the elements analysis performed by ICP-OES

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

- Technician: Jony Liu
- Supervisor: Ray Chang



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

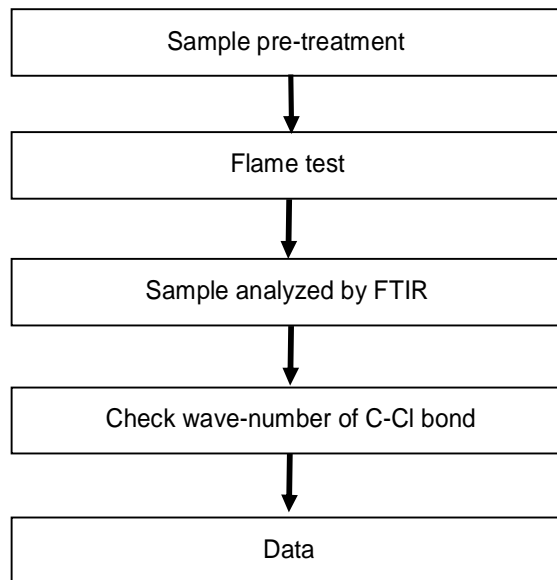


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### Analysis flow chart for determination of PVC in polymer material

- Technician: Hannah Tai
- Supervisor: Roger Lin



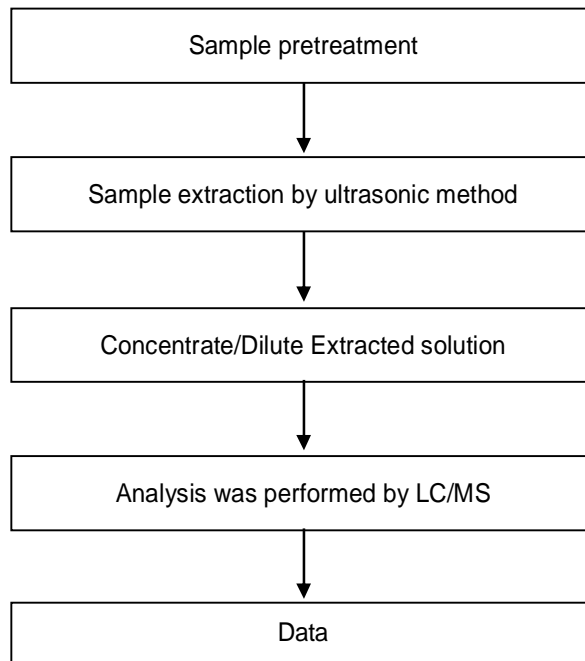
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### Analytical flow chart of PFOA/PFOS content

- Technician : Ginny Huang
- Supervisor: Ray Chang



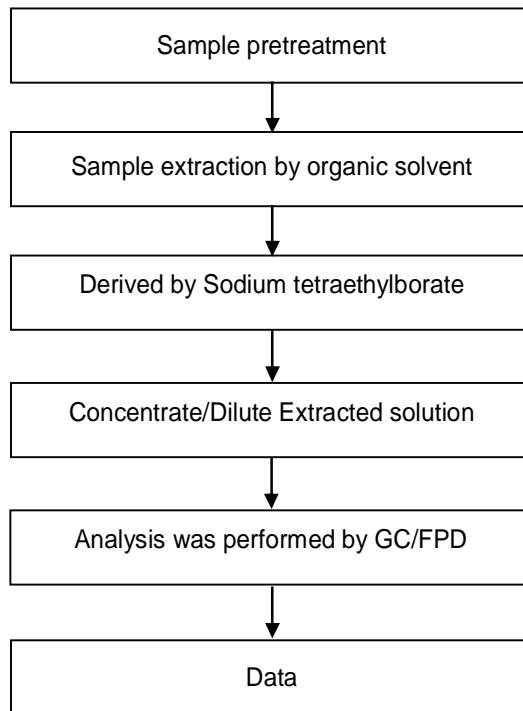
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### Analytical flow chart of Organic-Tin content

- Technician: Dorothy Chen
- Supervisor: Ray Chang



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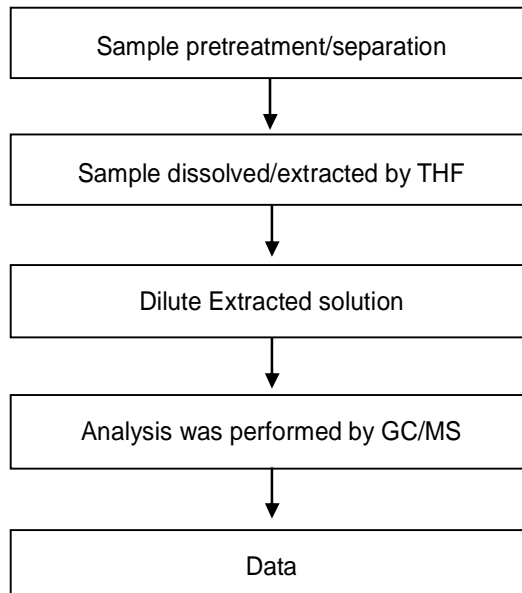
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### Analytical flow chart of phthalate content

- Technician: Dorothy Chen
- Supervisor: Ray Chang

**【Test method: IEC 62321-8】**



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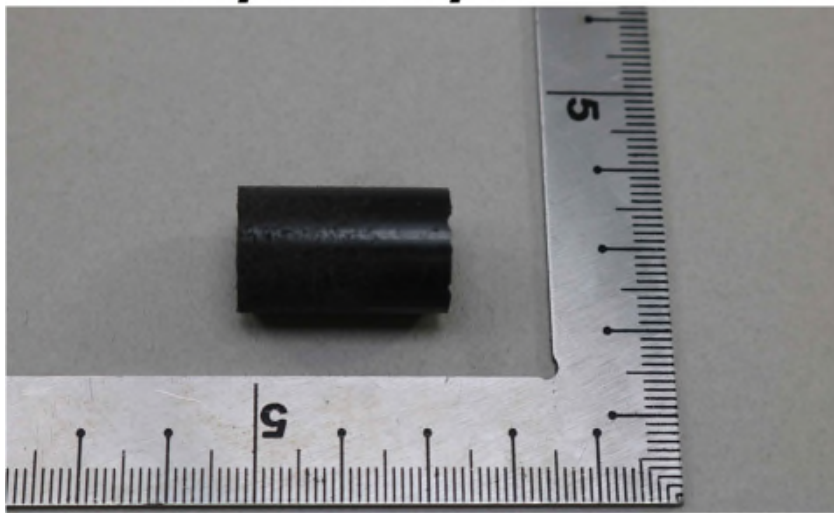
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\* The tested sample / part is marked by an arrow if it's shown on the photo. \*

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\*\* End of Report \*\*