



# Test Report No. F690101/LF-CTSAYAA15-58791R1

Issued Date : 2015. 12. 01

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## SAMSUNG ELECTRO-MECHANICS CO., LTD.

314Maetan-dong, Yeoungtong-gu  
Suwon-si, Gyeonggi-do  
Korea

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

**SGS File No.** : AYAA15-58791R1  
**Product Name** : MLCC A(X5R) J(JIS-B) X(X6S) TYPE  
**Item No./Part No.** : N/A  
**Received Date** : 2015. 11. 18  
**Test Period** : 2015. 11. 18 to 2015. 12. 01  
**Test Comments** : By the applicant's specific request, the sampling and testing was performed only for the part indicated in the photo without disassembly.  
**Supersede/Referral** : The test report supercedes previous report number, "F690101/LF-CTSAYAA15-58791" issued by SGS Korea Co., Ltd.  
**Test Results** : For further details, please refer to following page(s)

SGS Korea Co., Ltd.

Jeff Jang / Chemical Lab Mgr

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Sample No. : AYAA15-58791R1.001  
Sample Description : MLCC A(X5R) J(JIS-B) X(X6S) TYPE  
Item No./Part No. : N/A  
Materials : N/A

## Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Antimony (Sb)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	10	N.D.
Beryllium (Be)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Lead by ICP-OES)	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008 (Determination of Hexavalent Chromium by spot test/Colorimetric Method using UV-Vis)	1	N.D.

## Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.

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Sample No. : AYAA15-58791R1.001  
Sample Description : MLCC A(X5R) J(JIS-B) X(X6S) TYPE  
Item No./Part No. : N/A  
Materials : N/A

## Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.

## Phthalates

Test Items	Unit	Test Method	MDL	Results
Di-methyl phthalate (DMP)	mg/kg	With reference to EN14372, GC/MS	50	N.D.
Di-ethyl phthalate (DEP)	mg/kg	With reference to EN14372, GC/MS	50	N.D.
Di-isobutyl phthalate (DIBP)	mg/kg	With reference to EN14372, GC/MS	50	N.D.
Di-isodecyl phthalate (DIDP)	mg/kg	With reference to EN14372, GC/MS	50	N.D.
Di-isononyl phthalate (DINP)	mg/kg	With reference to EN14372, GC/MS	50	N.D.
Di-n-octyl phthalate (DNOP)	mg/kg	With reference to EN14372, GC/MS	50	N.D.
Di-(2-ethylhexyl) phthalate (DEHP)	mg/kg	With reference to EN14372, GC/MS	50	N.D.
Benzyl butyl phthalate (BBP)	mg/kg	With reference to EN14372, GC/MS	50	N.D.
Di-butyl phthalate (DBP)	mg/kg	With reference to EN14372, GC/MS	50	N.D.

## Chlorinated Paraffin

Test Items	Unit	Test Method	MDL	Results
Alkanes, C10~13, Short Chain Chlorinated Paraffins	mg/kg	EPA 3540 C, GC/MS	50	N.D.

## Chlorinated Organic Substances

Test Items	Unit	Test Method	MDL	Results
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Sample No. : AYAA15-58791R1.001  
Sample Description : MLCC A(X5R) J(JIS-B) X(X6S) TYPE  
Item No./Part No. : N/A  
Materials : N/A

## Chlorinated Organic Substances

Test Items	Unit	Test Method	MDL	Results
Polychlorinated Biphenyls (PCBs)	mg/kg	USEPA 8082 , GC/MS	3	N.D.
Polychlorinated terphenyls (PCTs)	mg/kg	USEPA 8082 , GC/MS	3	N.D.
Polychlorinated Naphthalene (PCN)	mg/kg	EPA 8081 A , GC/MS	5	N.D.

## Polymer Identification

Test Items	Unit	Test Method	MDL	Results
PVC	**	FT-IR	-	Negative

## Halogen Content

Test Items	Unit	Test Method	MDL	Results
Bromine(Br)	mg/kg	With reference to EN 14582, IC	30	N.D.
Chlorine(Cl)	mg/kg	With reference to EN 14582, IC	30	N.D.

## Flame Retardants

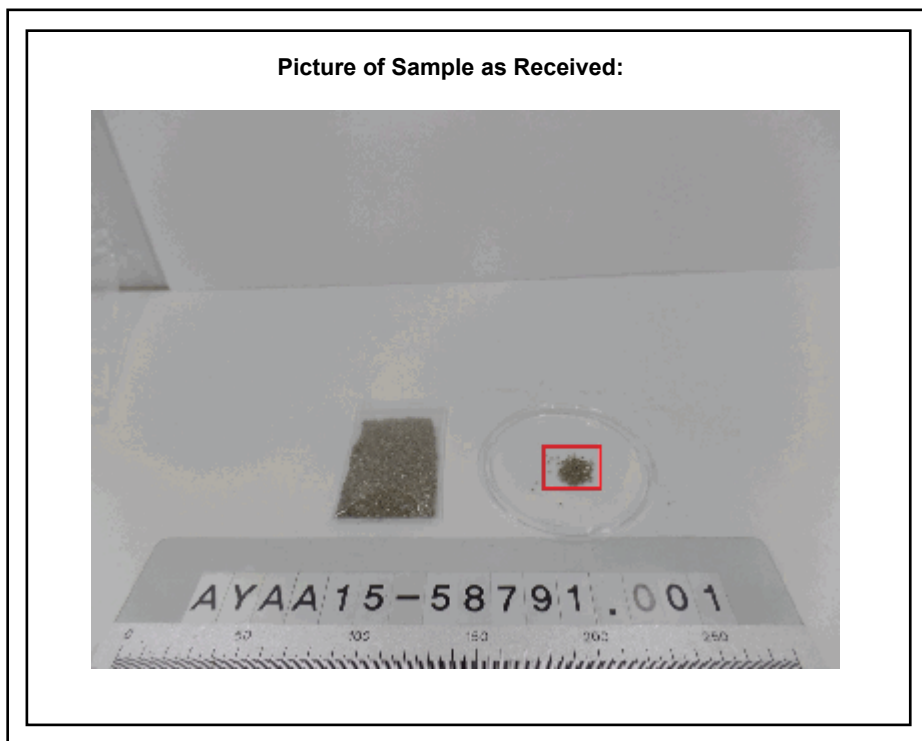
Test Items	Unit	Test Method	MDL	Results
Hexabromocyclododecane (HBCDD)	mg/kg	USEPA 3540C, LC/MS	5	N.D.

## Other(s)

Test Items	Unit	Test Method	MDL	Results
PFOA (Perfluorooctanoic acid)	mg/kg	US EPA 3540C/3550C, LC/MS	1	N.D.
PFOS (Perfluorooctane Sulfonates-Acid/Metal Salt/Amide)	mg/kg	US EPA 3540C/3550C, LC/MS	1	N.D.

- NOTE:
- (1) N.D. = Not detected.(<MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
  - (4) - = No regulation
  - (5) Negative = Undetectable / Positive = Detectable
  - (6) \*\* = Qualitative analysis (No Unit)
  - (7) \* = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 ug/cm<sup>2</sup>. The sample coating is considered to contain CrVI.  
b. The sample is negative for CrVI if CrVI is n.d. (concentration less than 0.10 ug/cm<sup>2</sup>). The coating is considered a non-CrVI based coating.  
c. The result between 0.10 ug/cm<sup>2</sup> and 0.13 ug/cm<sup>2</sup> is considered to be inconclusive - unavoidable coating variations may influence the determination.

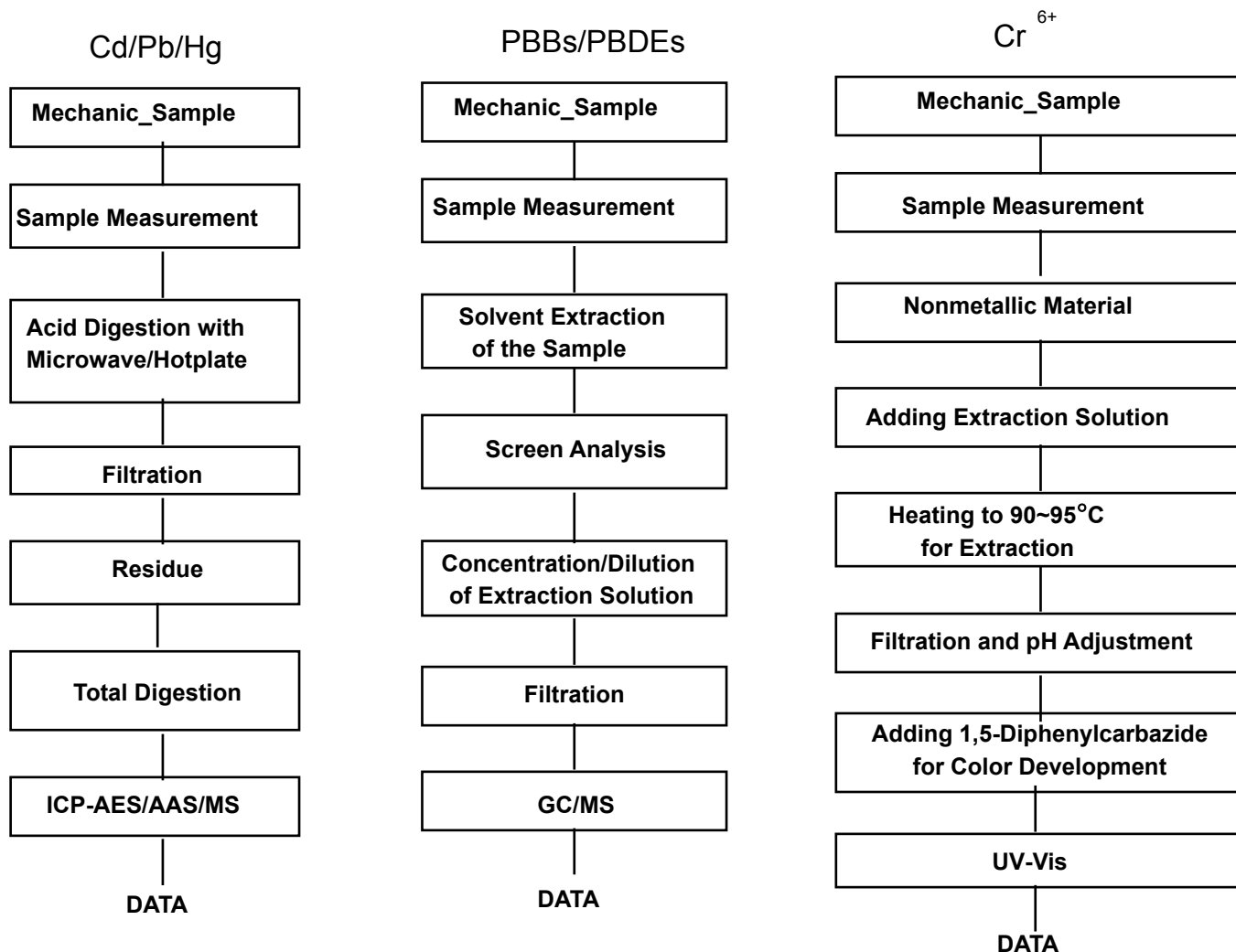
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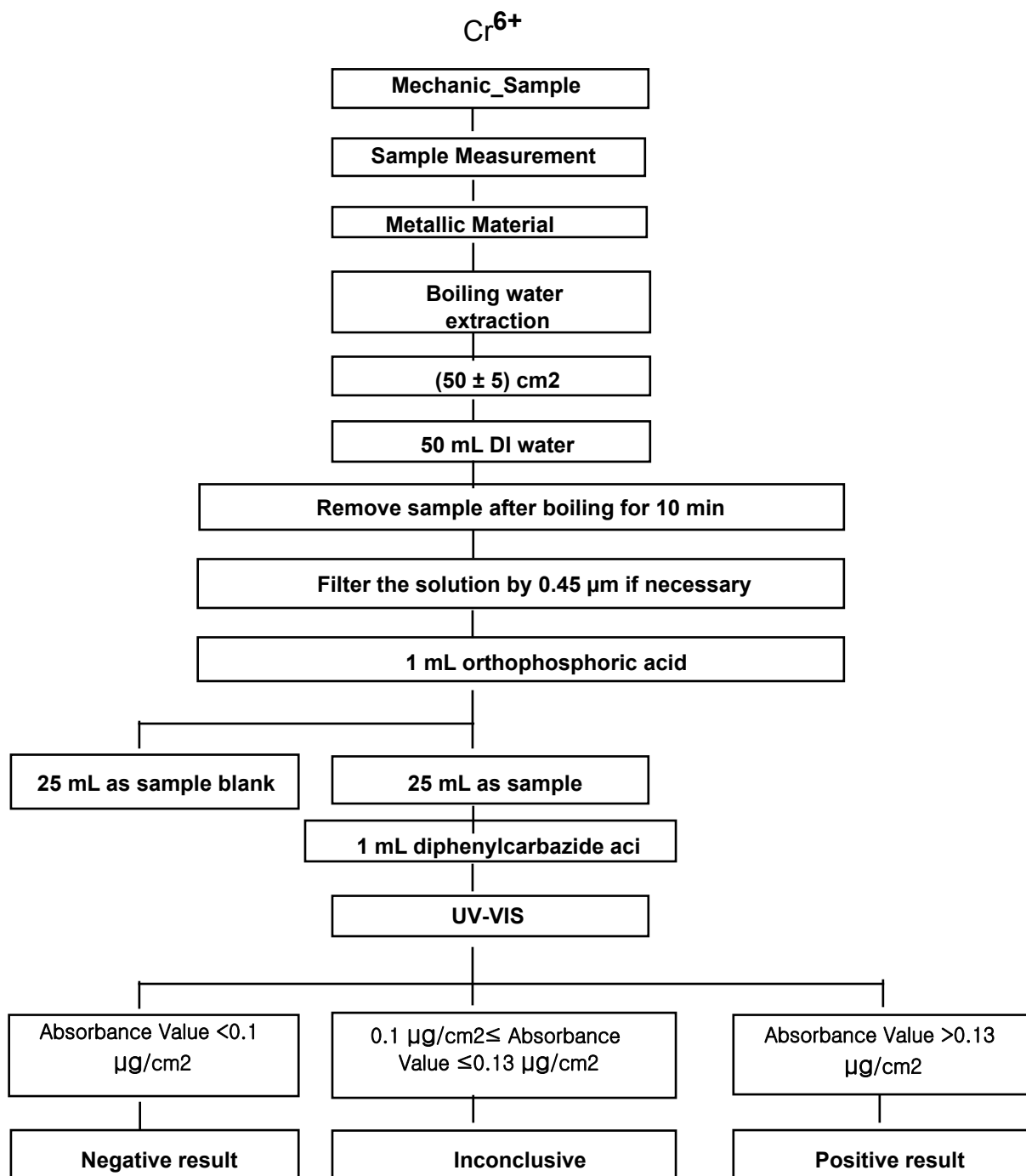
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**Testing Flow Chart for RoHS: Cd/Pb/Hg/Cr<sup>6+</sup> /PBBs&PBDEs Testing**



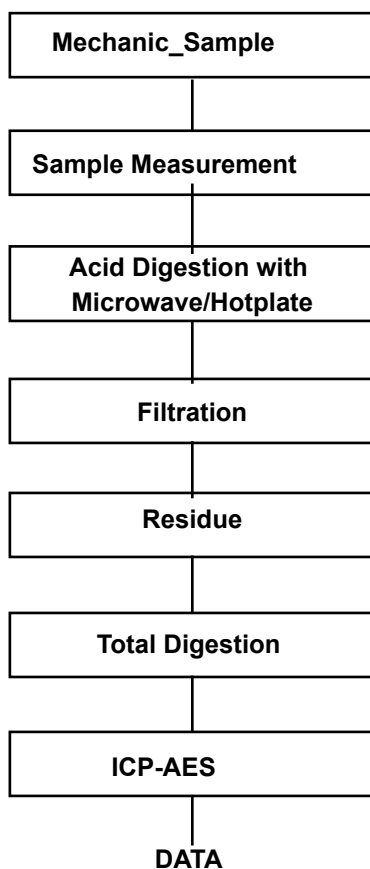
The samples were dissolved totally by pre-conditioning method according to above flow chart for Cd,Pb,Hg.  
Section Chief : Gilsae Yi





### Flow Chart for Inorganic Elements Testing

#### Inorganic Elements

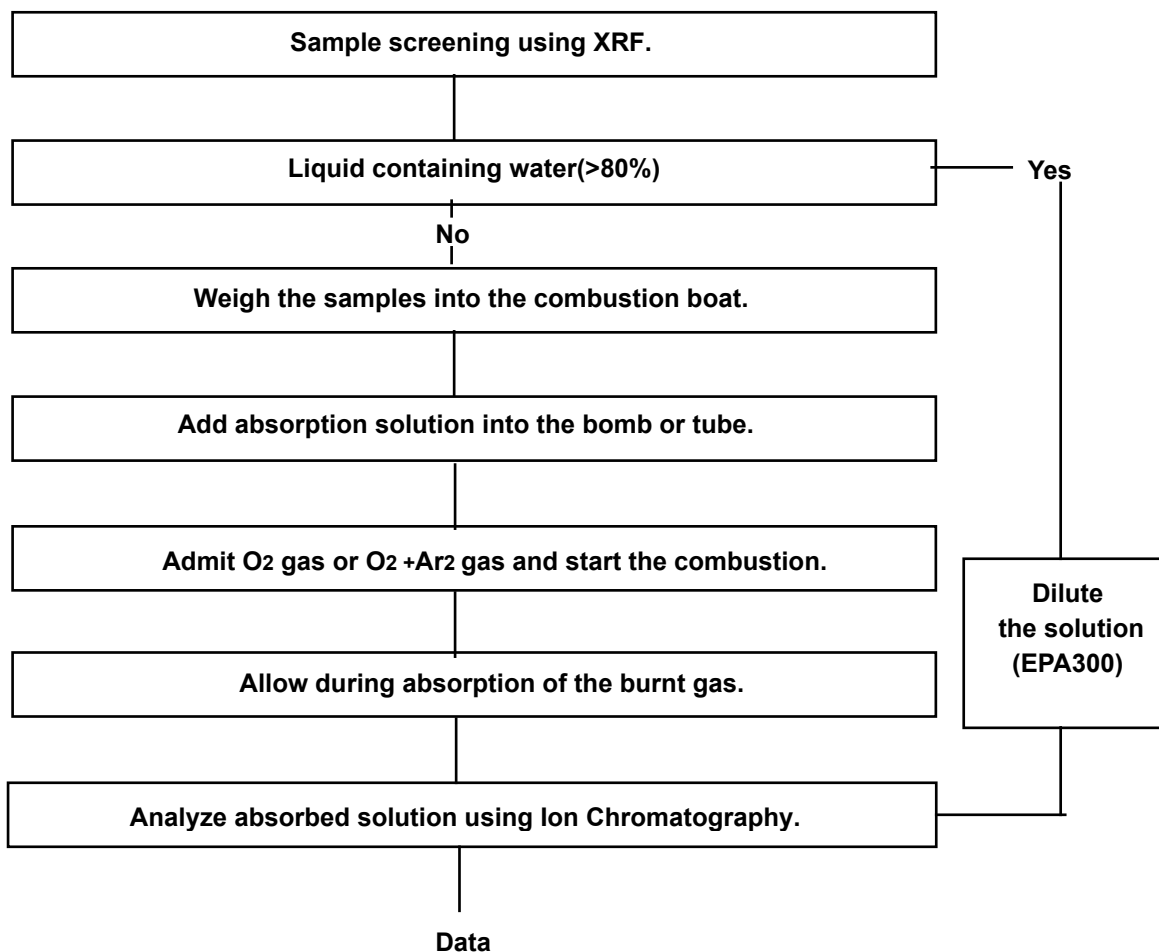


Major Inorganic Heavy Metals	Antimony(Sb) , Beryllium(Be) , Phosphorus(P) , Arsenic(As) etc.
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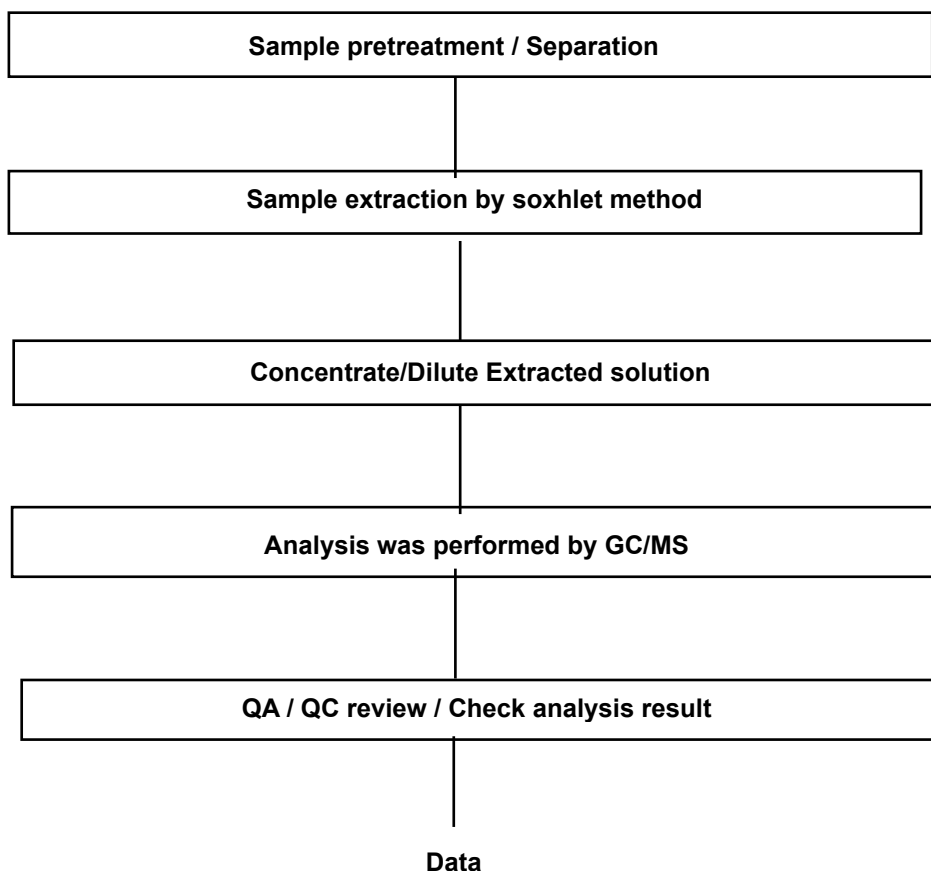


### Flow Chart for Halogen Test





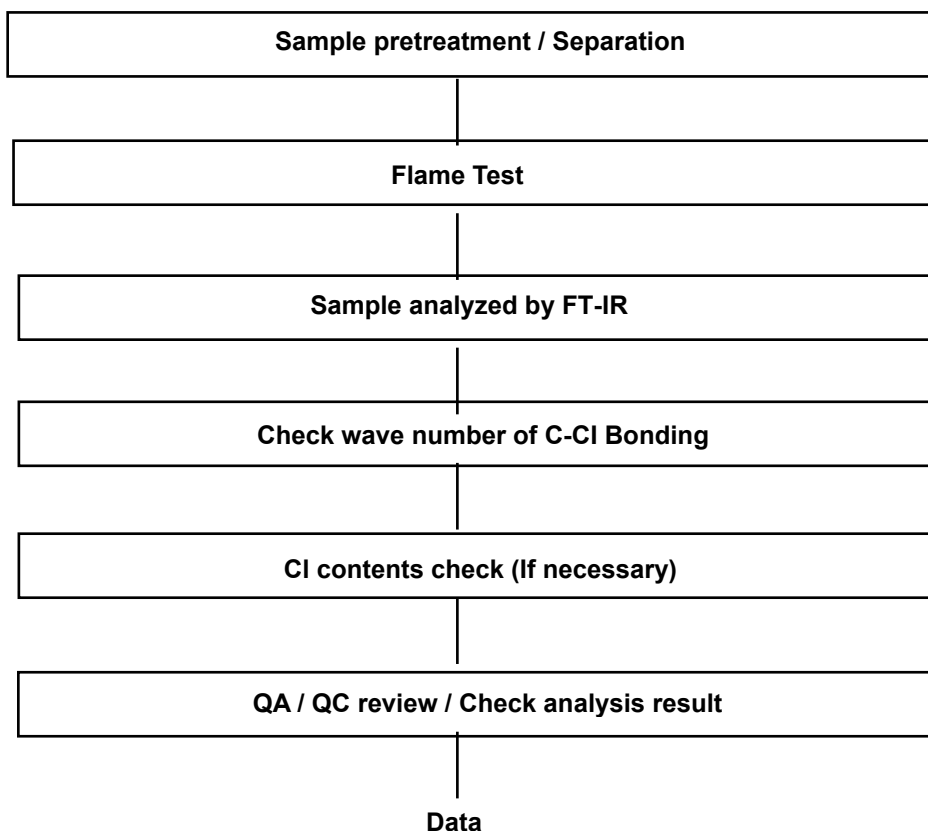
### Flow Chart for Phthalate Test



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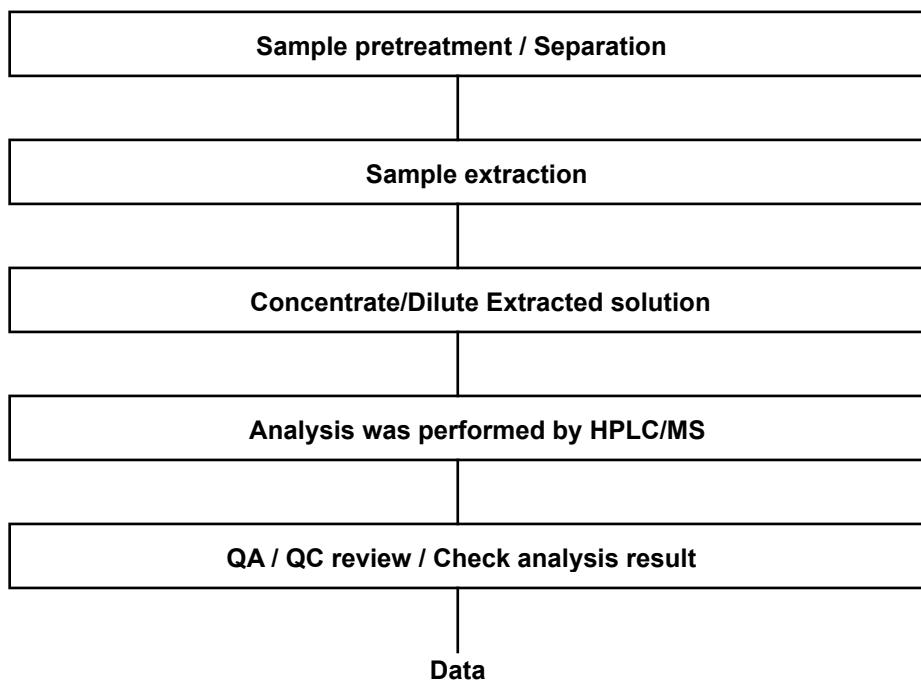
### Flow Chart for PVC Test



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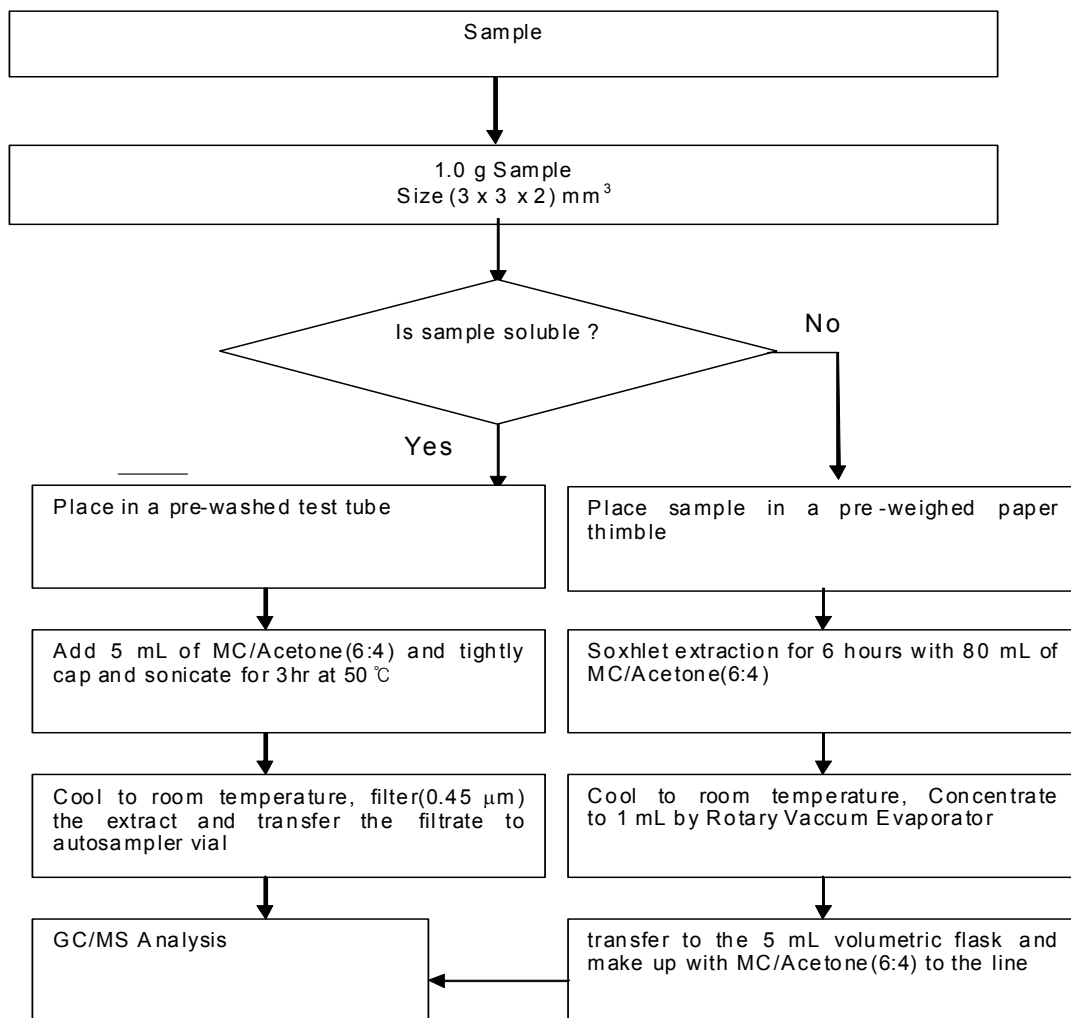
### Flow Chart for PFOS/PFOA Test



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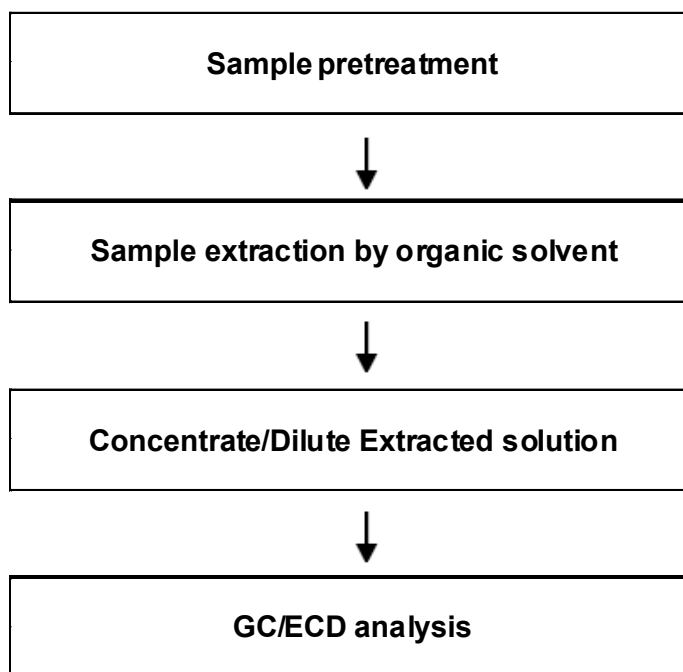


### PCBs,PCTs,PCNs Flow Chart





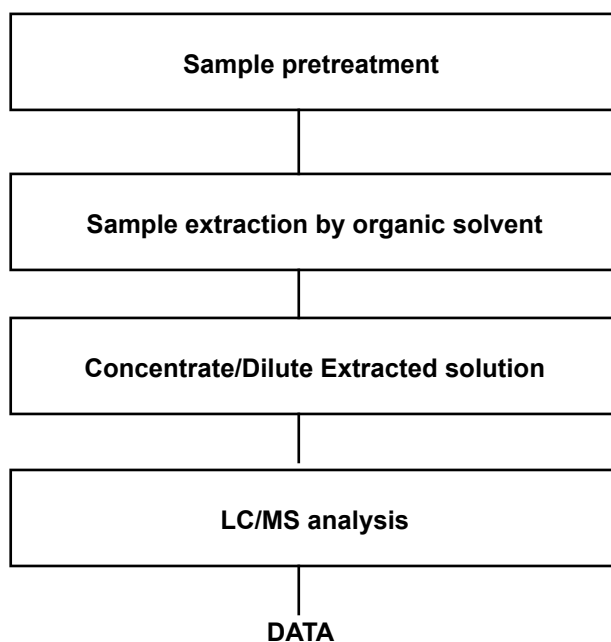
### SCCP Analysis Flow Chart



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### Testing Flow Chart for HBCD



\*\*\* End of Report \*\*\*