



# Test Report No. F690101/LF-CTSAYAA23-10095

Issued Date : 2023. 02. 27

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## YOUNG YIEL PRECISION CO., LTD

132, Beotkkot-ro  
Geumcheon-gu, Seoul  
Korea

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

**SGS File No.** : AYAA23-10095  
**Product Name** : Ni Plating Heat Spreader  
**Item No./Part No.** : N/A  
**Client Reference Data** : HEAT STIFFNER, SLUG, SINK, HAT TYPE, FLAT LID, FORGED LID, SINGLE WINDOW  
**Received Date** : 2023. 02. 20  
**Test Period** : 2023. 02. 20 to 2023. 02. 27  
**Report Comments** : By the applicant's request, item No.s/part No.s & client reference information are stated/added on report.  
**Test Results** : For further details, please refer to following page(s)

SGS Korea Co., Ltd.

Tommy Oh / Chemical Lab Mgr

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**Sample No.** : AYAA23-10095.001  
**Sample Description** : Ni Plating Heat Spreader  
**Item No./Part No.** : N/A  
**Materials** : COPPER

**Heavy Metals**

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 : 2013, by ICP-OES	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5 : 2013, by ICP-OES	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4 : 2013+AMD1:2017CVS, by ICP-OES	2	N.D.
Hexavalent Chromium (Cr VI)*	µg/cm <sup>2</sup>	With reference to IEC 62321-7-1 : 2015, by UV-Vis	0.1	N.D.

**Total Metals**

Test Items	Unit	Test Method	MDL	Results
Antimony (Sb)	mg/kg	With reference to EPA 3052 : 1996, EPA 6010D : 2018, by ICP-OES	10	N.D.
Arsenic (As)	mg/kg	With reference to EPA 3052 : 1996, EPA 6010D : 2018, by ICP-OES	10	N.D.
Beryllium (Be)	mg/kg	With reference to EPA 3052 : 1996, EPA 6010D : 2018, by ICP-OES	5	N.D.

**Flame Retardants-PBBs/PBDEs**

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.

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**Sample Description** : Ni Plating Heat Spreader  
**Item No./Part No.** : N/A  
**Materials** : COPPER

**Flame Retardants-PBBs/PBDEs**

Test Items	Unit	Test Method	MDL	Results
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321-6 : 2015, by GC-MS	5	N.D.

**Phthalates**

Test Items	Unit	Test Method	MDL	Results
Di-(2-ethylhexyl) phthalate (DEHP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Di-butyl phthalate (DBP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Benzyl butyl phthalate (BBP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Di-isobutyl phthalate (DIBP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Di-isodecyl phthalate (DIDP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Di-isononyl phthalate (DINP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Di-n-octyl phthalate (DNOP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Di-n-hexyl phthalate (DNHP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
[di(C7-C11 alkyl)phthalate] linear and branched (DHNUP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.

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**Phthalates**

Test Items	Unit	Test Method	MDL	Results
[di(C6-C8 alkyl)phthalate] branched (DIHP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Bis(2-methoxyethyl) phthalate (BMP, BMEP, DMEP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.

**Chlorinated Paraffin**

Test Items	Unit	Test Method	MDL	Results
Alkanes, C10~13, Short Chain Chlorinated Paraffins(SCCP)	mg/kg	With reference to ISO 18219, by GC-MS(CI)	50	N.D.

**Chlorinated Organic Substances**

Test Items	Unit	Test Method	MDL	Results
Polychlorinated Naphthalene (PCN)	mg/kg	With reference to US EPA 8081 A(US EPA 3550C), by GC/MS	5	N.D.

**PCBs & PCTs**

Test Items	Unit	Test Method	MDL	Results
Polychlorinated Biphenyls (PCBs)	mg/kg	With reference to US EPA 8082,(US EPA 3550C), by GC/MS	3	N.D.
Polychlorinated terphenyls (PCTs)	mg/kg	With reference to US EPA 8082,(US EPA 3550C), by GC/MS	3	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 BS EN 14582 : 2016, by IC	30	N.D.
Chlorine(Cl)	mg/kg	With reference to BS EN 14582 : 2016, by IC	30	N.D.

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**Halogen Content**

Test Items	Unit	Test Method	MDL	Results
Fluorine(F)	mg/kg	With reference to BS EN 14582 : 2016, by IC	30	N.D.
Iodine(I)	mg/kg	With reference to BS EN 14582 : 2016, by IC	50	N.D.

**Organotin Compounds**

Test Items	Unit	Test Method	MDL	Results
Tributyltin (TBT)	mg/kg	with reference to ISO 17353, by GC/MS	1	N.D.
Triphenyltin (TPHT)	mg/kg	with reference to ISO 17353, by GC/MS	1	N.D.
Dibutyltin (DBT)	mg/kg	with reference to ISO 17353, by GC/MS	1	N.D.
Bis (tributyltin)oxide (TBTO)	mg/kg	with reference to ISO 17353, by GC/MS	1	N.D.
Diocetyl tin(DOT)	mg/kg	with reference to ISO 17353, by GC/MS	1	N.D.

**Ozone Depleting Substances**

Test Items	Unit	Test Method	MDL	Results
Trichlorofluoromethane (CFC-11)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,2,2-Tetrachloro-1,2-difluoroethane (CFC-112)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC-114)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1-Chloro-1,1,2,2,2-pentafluoroethane (CFC-115)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Dichlorodifluoromethane (CFC-12)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Chlorotrifluoromethane (CFC-13)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,1,3,3,3-Hexachloro-2,2-difluoropropane (CFC-212)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,1,3,3-Pentachloro-2,2,3-trifluoropropane (CFC-213)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.

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**Ozone Depleting Substances**

Test Items	Unit	Test Method	MDL	Results
1,1,3-Trichloro-1,2,2,3,3-pentafluoropropane (CFC-215cb)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2-Dichloro-1,1,2,3,3,3-hexafluoropropane (CFC-216)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1-Chloro-1,1,2,2,3,3,3-heptafluoropropane (CFC-217)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,2,2-Tetrachloro-1-fluoroethane (HCFC-121)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2,2-Trichloro-1,1-difluoroethane (HCFC-122)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,2-Trichloro-2-fluoroethane (HCFC-131)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1-Dichloro-1-fluoroethane (HCFC-141b)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1-Chloro-1,1-difluoroethane (HCFC-142b)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1-Chloro-1-fluoroethane (HCFC-151)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Dichlorofluoromethane (HCFC-21)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Chlorodifluoromethane (HCFC-22)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,3,3-Trichloro-1,1,2,2-tetrafluoropropane (HCFC-224ca)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Chlorofluoromethane (HCFC-31)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.

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**Materials** : COPPER

**Ozone Depleting Substances**

Test Items	Unit	Test Method	MDL	Results
2-Chloro-1,1,1,3,3,3-hexafluoro-propane (HCFC-226da)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
3-Chloro-1,1,1-trifluoropropane (HCFC-253fb)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2-Dichloro-2-fluoropropane (HCFC-261ba)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Methyl bromide (Halon-1001)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Bromochloromethane (Halon-1011)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Dibromodifluoromethane (Halon-1202)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Bromochlorodifluoromethane (Halon-1211)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Bromotrifluoromethane (Halon-1301)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2-Dibromo-1,1,2,2-tetrafluoroethane (Halon-2402)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2-Dibromo-1,1-difluoroethane (HBFC-132B2)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
2-Bromo-1,1,1-trifluoroethane (HBFC-133B1)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1-Bromo-2-fluoroethane (HBFC-151B1)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Dibromofluoromethane (HBFC-21B2)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Bromodifluoromethane (HBFC-22B1)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1-Bromo-3-fluoropropane (HBFC-271B1)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Bromofluoromethane (HBFC-31B1)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,1,2,2-Pentafluoroethane (HFC-125)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,2,2-Tetrafluoroethane (HFC-134)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,1,2-Tetrafluoroethane (HFC-134a)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,2-Trifluoroethane (HFC-143)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,1-Trifluoroethane (HFC-143a)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.

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**Materials** : COPPER

**Ozone Depleting Substances**

Test Items	Unit	Test Method	MDL	Results
1,1-Difluoroethane (HFC-152a)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,1,2,3,3,3-Heptafluoropropane (HFC-227ea)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Fluoroform (HFC-23)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,1,2,3,3-Hexafluoropropane (HFC-236ea)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,1,3,3,3-Hexafluoropropane (HFC-236fa)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,2,2,3-Pentafluoropropane (HFC-245ca)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,4-Dihydrooctafluorobutane (HFC-338)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Fluoromethane (HFC-41)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
2-Perfluoromethylpentane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Carbon tetrafluoride	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Nonafluoro-2-(trifluoromethyl)butane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Perfluoro-1-butane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Perfluorobutane (Decafluorobutane)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Perfluorocyclobutane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Perfluoroethane (Hexafluoroethane)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Perfluorohexane (Tetradecafluorohexane)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Perfluoroisobutene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Perfluoropentane (Dodecafluoropentane)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Perfluoropropane (Octafluoropropane)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,1,2-Tetrachloroethane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,2,2-Tetrachloroethane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1,2-Trichloroethane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.

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**Sample No.** : AYAA23-10095.001  
**Sample Description** : Ni Plating Heat Spreader  
**Item No./Part No.** : N/A  
**Materials** : COPPER

**Ozone Depleting Substances**

Test Items	Unit	Test Method	MDL	Results
1,1-Dichloroethane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1-Dichloroethene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,1-Dichloropropene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2,3-Trichloropropane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2-Dichloroethane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,2-Dichloropropane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1,3-Dichloropropane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
2,2-Dichloropropane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Carbon tetrachloride	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Chloroethane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Chloroform	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
cis-1,2-Dichloroethene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
cis-1,3-Dichloropropene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Dichloromethane	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Hexachlorobutadiene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Methyl chloride	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Methylchloroform	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Tetrachloroethene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
trans-1,2-Dichloroethene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
trans-1,3-Dichloropropene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Trichloroethylene	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
1-Bromopropane (n-Propyl bromide)	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.
Sulfur hexafluoride	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.

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**Sample No.** : AYAA23-10095.001  
**Sample Description** : Ni Plating Heat Spreader  
**Item No./Part No.** : N/A  
**Materials** : COPPER

**Ozone Depleting Substances**

Test Items	Unit	Test Method	MDL	Results
Trifluoromethyl iodide	mg/kg	EPA 5021A :2014, GC/MS	1	N.D.

**Flame Retardants**

Test Items	Unit	Test Method	MDL	Results
Tetrabromobisphenol A	mg/kg	With reference to US EPA 3540C, by GC-MS	10	N.D.
Hexabromocyclododecane (HBCDD)	mg/kg	With reference to USEPA 3540 C, by LC/MS	5	N.D.

**Azo Dyes**

Test Items	Unit	Test Method	MDL	Results
o-Toluidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
2,4-Xylidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
2,6-Xylidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
o-Anisidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
p-Chloroaniline	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
p-Cresidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
2,4,5-Trimethylaniline	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
4-Chloro-o-Toluidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
2,4-Toluenediamine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
2,4-Diaminoanisole	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
2-Naphtylamine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
2-Amino-4-Nitrotoluene	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.

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**Sample No.** : AYAA23-10095.001  
**Sample Description** : Ni Plating Heat Spreader  
**Item No./Part No.** : N/A  
**Materials** : COPPER

**Azo Dyes**

Test Items	Unit	Test Method	MDL	Results
4-Aminodiphenyl	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
4,4'-Oxydianiline	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
Benzidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
4,4'-diaminodiphenylmethane	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
o-Aminoazotoluene	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
3,3-Dimethyl-4,4'-diaminodiphenyl methane	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
3,3-Dimethylbenzidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
4,4'-Thiodianiline	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
3,3'-Dichlorobenzidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
4,4'-Methylen-bis-(2-chloroaniline)	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
3,3-Dimethoxybenzidine	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.
4-Aminoazobenzene	mg/kg	With reference to EN 14362-1:2012, GC/MS & HPLC/DAD	5	N.D.

**Other(s)**

Test Items	Unit	Test Method	MDL	Results
2-Benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320)	mg/kg	with reference to DIN EN 62321-6, GC/MS	50	N.D.

**Perfluorinated Compounds (PFC)**

Test Items	Unit	Test Method	MDL	Results
Perfluorootanoic acid (PFOA) and its salts +	µg/kg	CEN/TS 15968, LC/MS/MS	10	N.D.

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# Test Report No. F690101/LF-CTSAYAA23-10095

Issued Date : 2023. 02. 27

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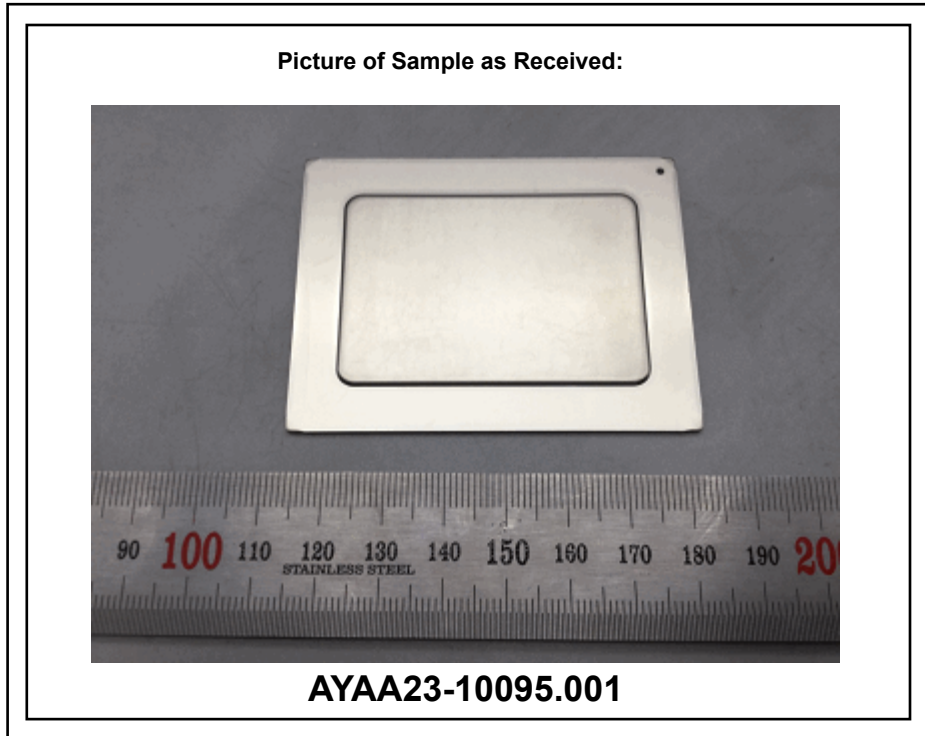
**Sample No.** : AYAA23-10095.001  
**Sample Description** : Ni Plating Heat Spreader  
**Item No./Part No.** : N/A  
**Materials** : COPPER

## Perfluorinated Compounds (PFC)

Test Items	Unit	Test Method	MDL	Results
Perfluorooctane sulfonate (PFOS) and its salts ^	µg/kg	CEN/TS 15968, LC/MS/MS	10	N.D.

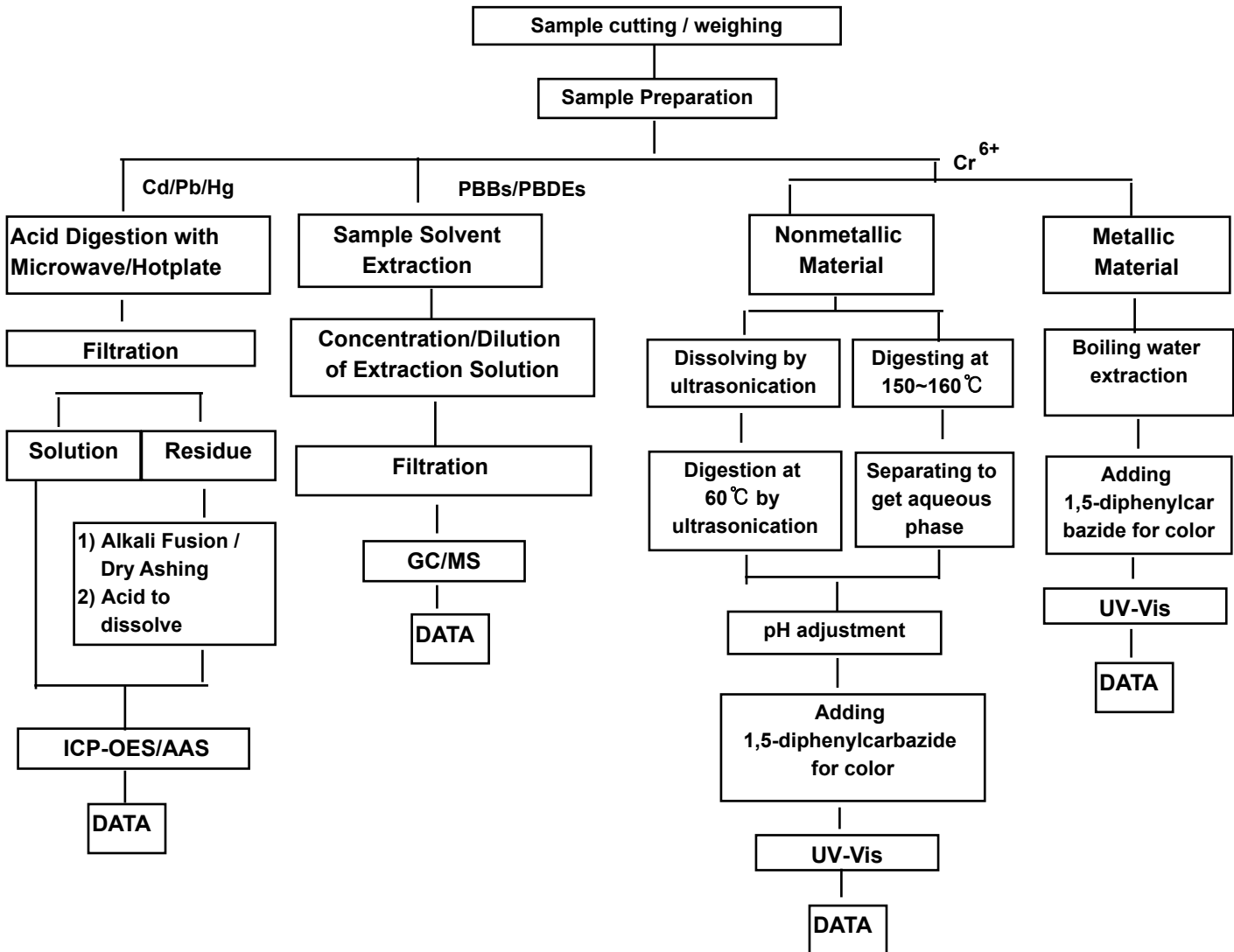
- NOTE:
- (1) N.D. = Not detected. (<MDL)
  - (2) mg/kg = ppm, µg/kg = ppb, mg/L = ppm
  - (3) MDL = Method Detection Limit
  - (4) - = No regulation
  - (5) \*\* = Qualitative analysis (No Unit)
  - (6) Negative = Undetectable / Positive = Detectable
  - (7) \* = a. The sample is positive for Cr VI if the Cr VI concentration is greater than 0.13 µg/cm<sup>2</sup>.  
The sample coating is considered to contain Cr VI.  
b. The sample is negative for Cr VI if Cr VI is ND(concentration less than 0.10 µg/cm<sup>2</sup>).  
The coating is considered a non-Cr VI based coating.  
c. The result between 0.10 µg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive – unavoidable coating variations may influence the determination.
  - (8) Ozone Depleting Substance test result(s) was/were obtained by semi-quantitative analysis using reference substances
  - (9) The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
This test report is not related to Korea Laboratory Accreditation Scheme .

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



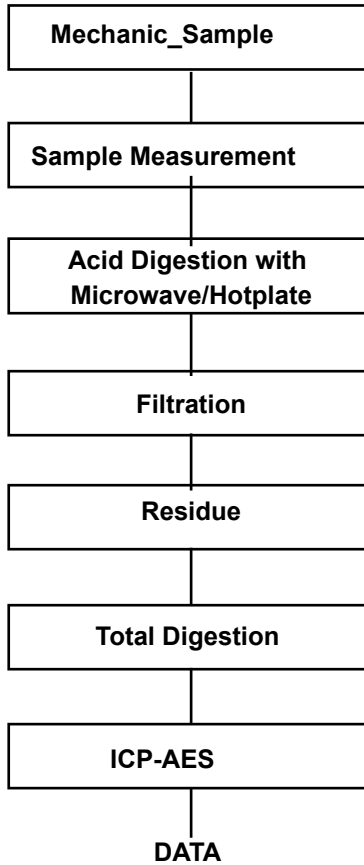
The samples were dissolved totally at the acid digestion step of the above flow chart for Cd,Pb,Hg  
 Section Chief : Timothy Jeon

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### Flow Chart for Inorganic Elements Testing

#### Inorganic Elements

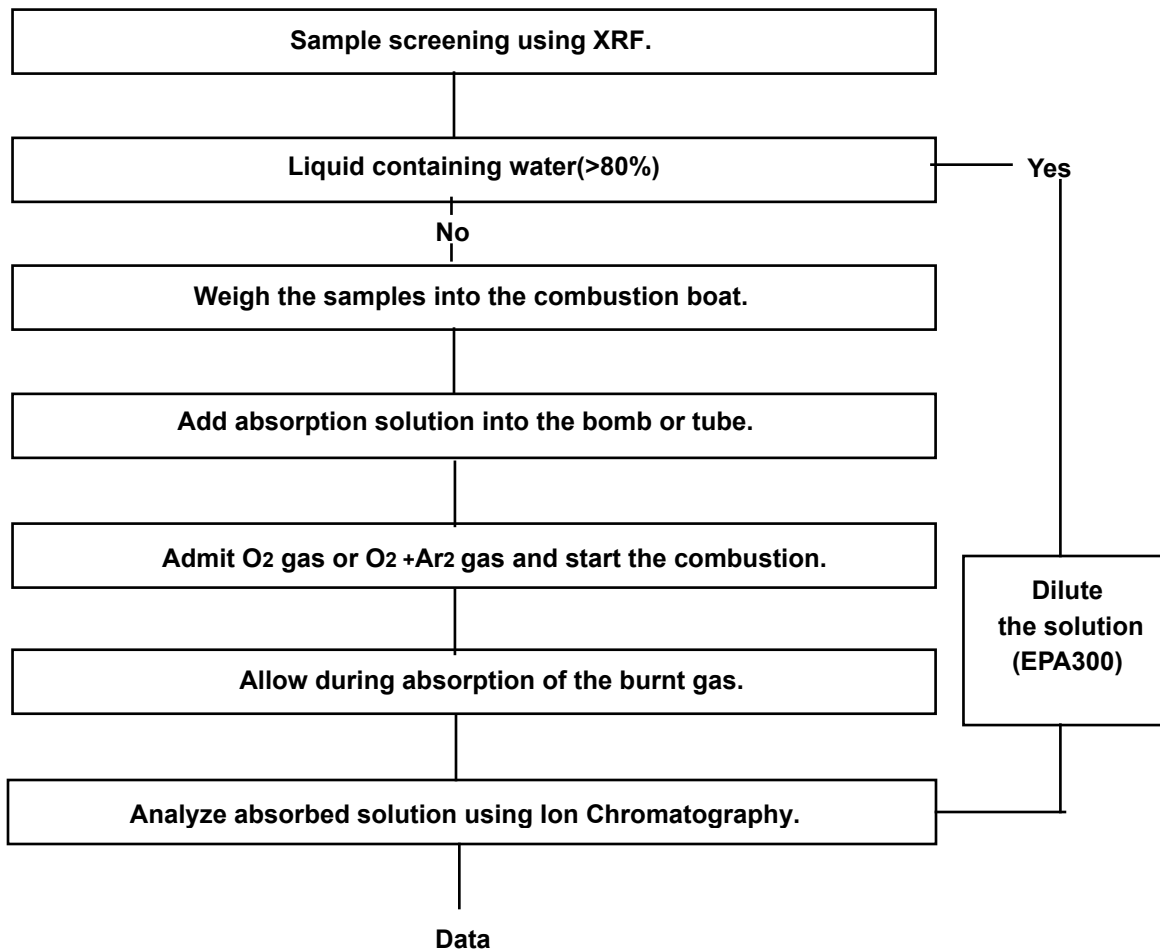


Major Inorganic Heavy Metals	Antimony(Sb) , Beryllium(Be) , Phosphorus(P) , Arsenic(As) etc.
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### Flow Chart for Halogen Test

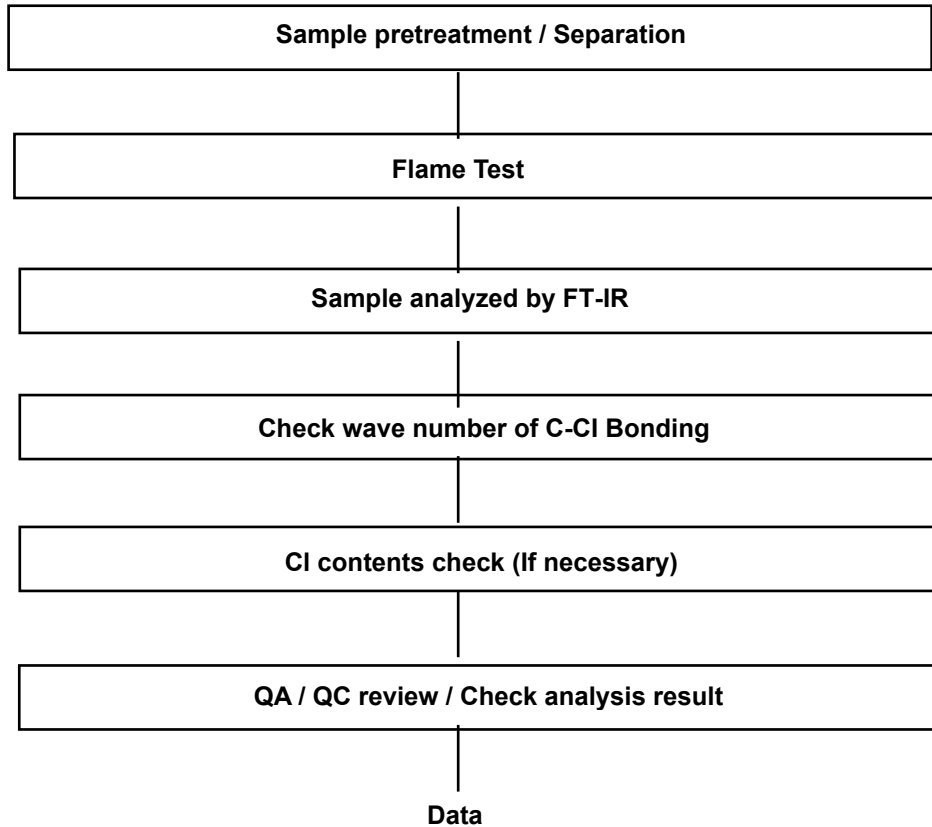


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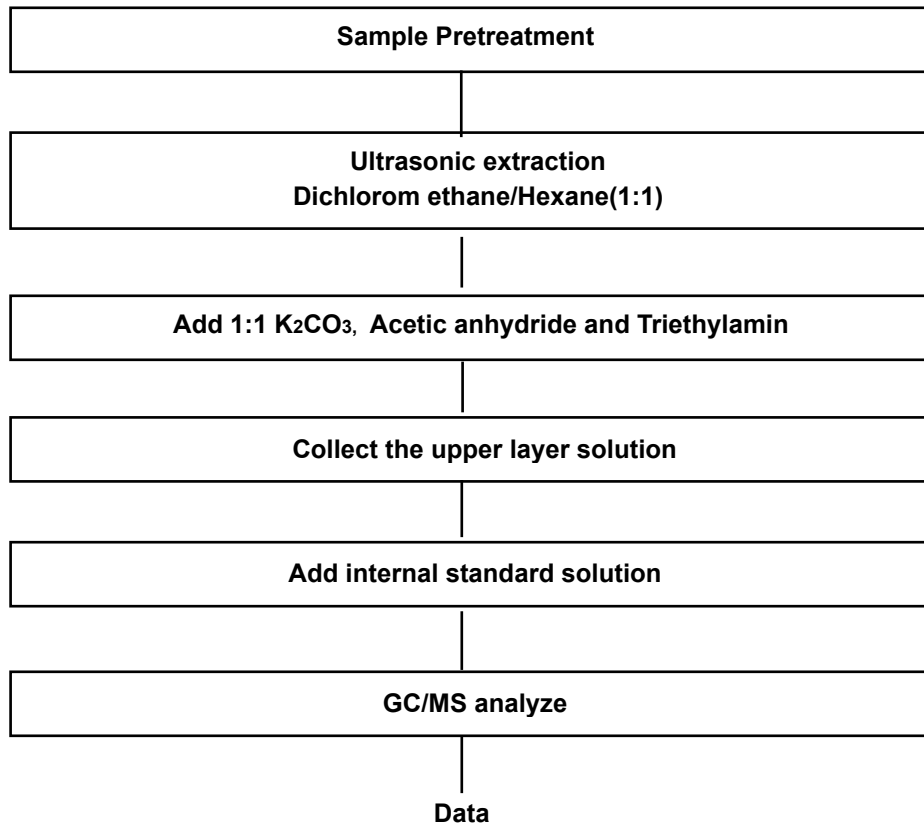
### Flow Chart for PVC Test



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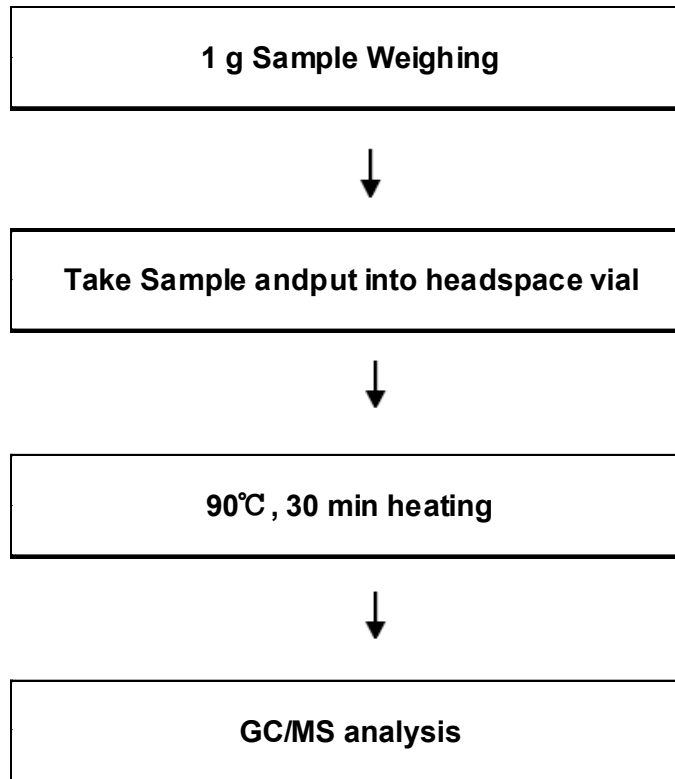
### Flow Chart for TBBPA Test



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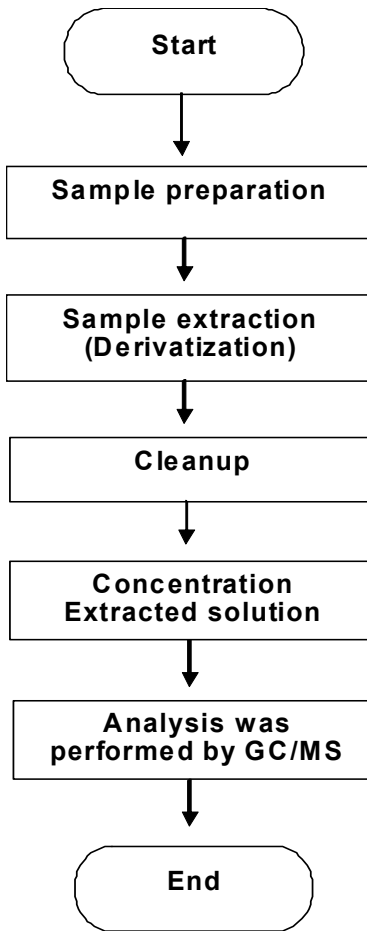
### ODS Analysis Flow Chart



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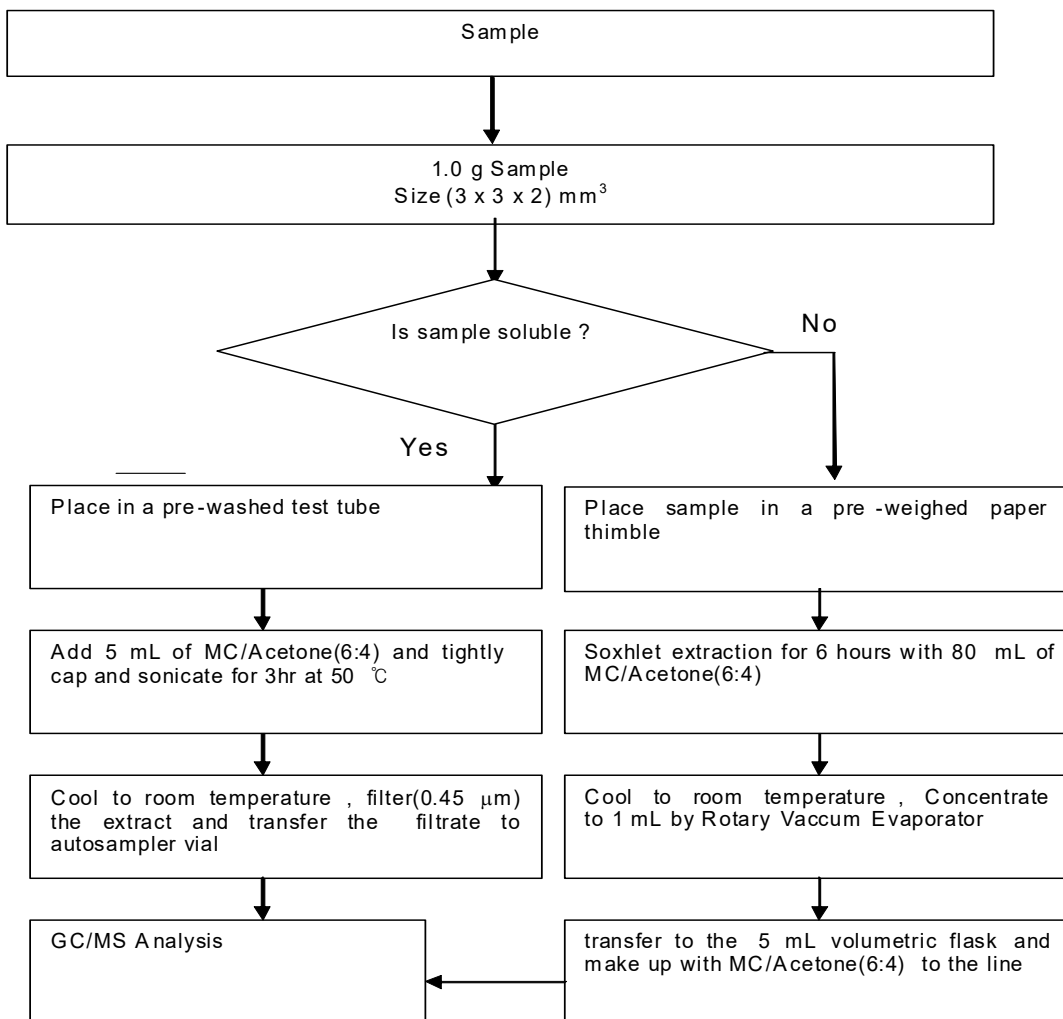
### Organotin Flow Chart



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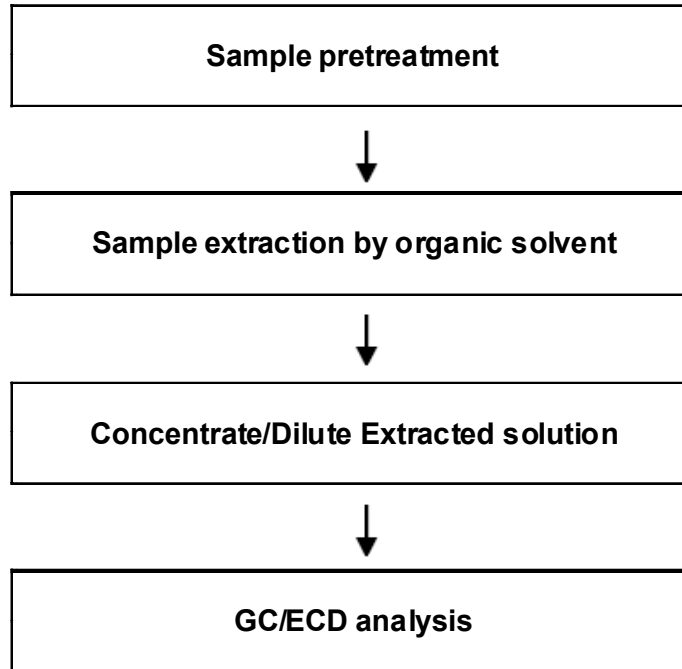
### PCBs,PCTs,PCNs Flow Chart



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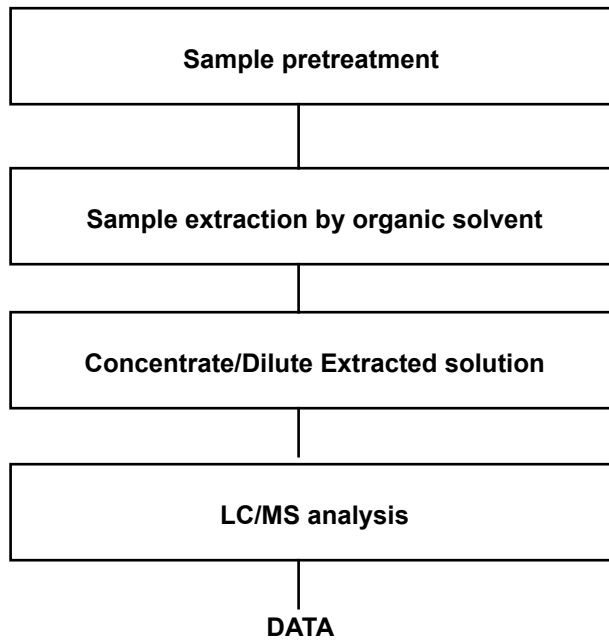
### SCCP Analysis Flow Chart



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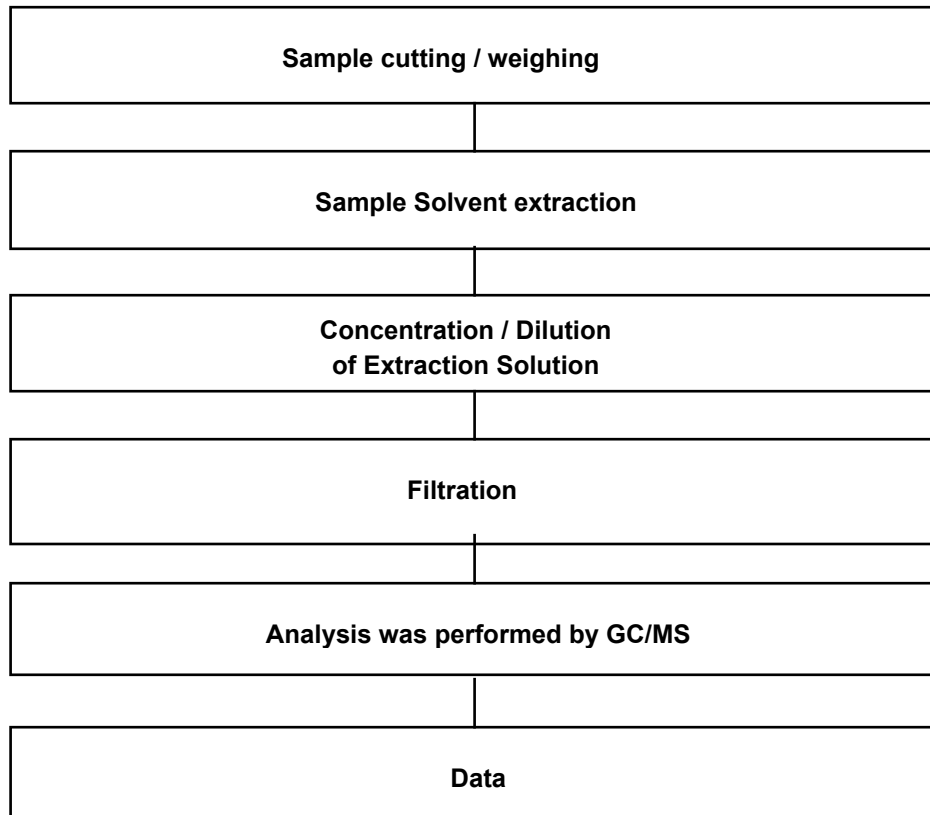
### Testing Flow Chart for HBCD



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### Flow Chart for Phthalate Test

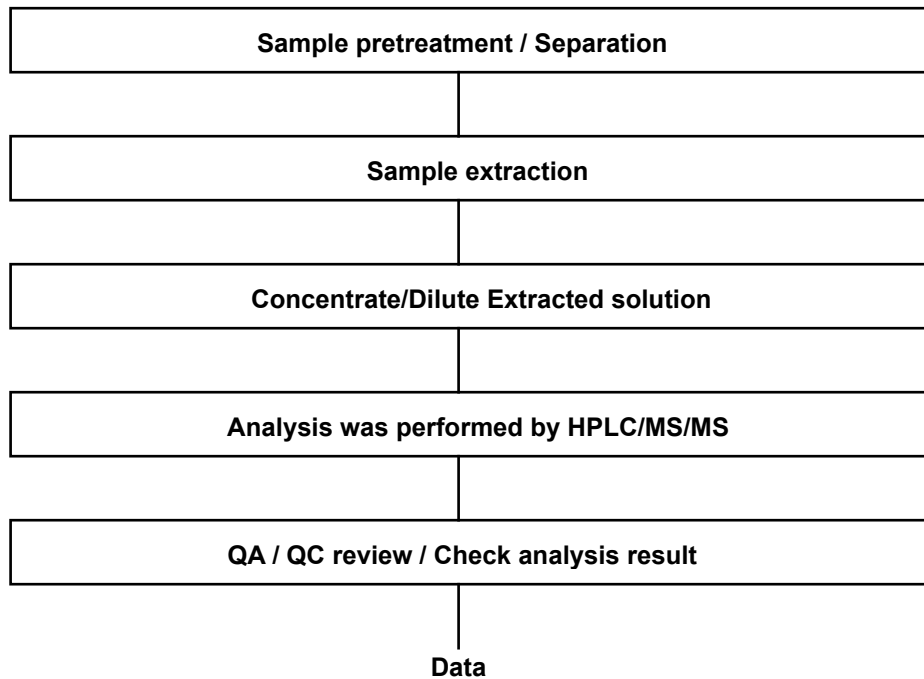


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### Flow Chart for PFOS/PFOA Test



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

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