



Test Report No. F690101/LF-CTSAYAA26-23048

Issued Date : 2026. 05. 13

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HD MICROSYSTEMS
250, Cheesequake
Rd424 Parlin, NJ08859
USA



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

SGS File No. : AYAA26-23048
Product Name : HD4004
Item No./Part No. : N/A
Received Date : 2026. 05. 06
Test Period : 2026. 05. 06 to 2026. 05. 13
Test Results : For further details, please refer to following page(s)

Monet Jeong

Technical Manager / SGS Korea Co., Ltd

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Sample No. : AYAA26-23048.001
Sample Description : HD4004
Item No./Part No. : N/A
Materials : Liquid Polyimide

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+AMD1:2017CSV, by ICP-OES	2	N.D.
Hexavalent Chromium (Cr VI)+	mg/kg	With reference to IEC 62321-7-2 : 2017, by UV-Vis and/or with reference to IEC 62321-5 : 2013, by ICP-OES	8	N.D.

Total Metals

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

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Sample No. : AYAA26-23048.001
Sample Description : HD4004
Item No./Part No. : N/A
Materials : Liquid Polyimide

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
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-isobutyl phthalate (DIBP)	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.
Bis(2-methoxyethyl) phthalate (BMP, BMEP, DMEP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Di-n-pentyl phthalate(DPP, DnPP)	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.
Benzyl butyl phthalate (BBP)	mg/kg	With reference to IEC 62321-8 : 2017, by GC-MS	50	N.D.
Di-(2-ethylhexyl) phthalate (DEHP)	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-isononyl phthalate (DINP)	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.

Halogen Content

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Sample No. : AYAA26-23048.001
Sample Description : HD4004
Item No./Part No. : N/A
Materials : Liquid Polyimide

Halogen Content

Test Items	Unit	Test Method	MDL	Results
Fluorine(F)	mg/kg	With reference to BS EN 14582 : 2016, by IC	30	107
Chlorine(Cl)	mg/kg	With reference to BS EN 14582 : 2016, by IC	30	N.D.
Bromine(Br)	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.

PFAS (Per-and polyfluoroalkyl substances)

Test Items	Unit	Test Method	MDL	Results
Perfluorohexanesulfonic Acid (PFHxS)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	10	N.D.
N-Methylperfluoro-1-hexanesulfonamide (N-MeFHxSA)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	100	N.D.
Perfluorohexane sulfonamide (PFHxSA)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	100	N.D.
N-[3-(dimethylamino)propyl] tridecafluorohexanesulphonamide (N-AP-FHxSA)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	100	N.D.
1-Hexanesulfonamide, 1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluoro-N-(2-hydroxyethyl)-N-methyl-(MeFHxSE)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	100	N.D.
Glycine, N-ethyl-N-[(1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluorohexyl)sulfonyl]- (EtFHxSAA)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	100	N.D.
Perfluorootanoic acid (PFOA)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	10	N.D.
Perfluorooctanesulfonic Acid (PFOS)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	10	N.D.
2-[methyl[(tridecafluorohexyl)sulphonyl]amino]ethyl acrylate)) (N-MeFHSEA)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	200	N.D.
2-Propenoic acid, 2-methyl-, 2-[ethyl[(1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluorohexyl)sulfonyl]amino]ethyl ester (EtFHxSEMA)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	200	N.D.

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Sample No. : AYAA26-23048.001
Sample Description : HD4004
Item No./Part No. : N/A
Materials : Liquid Polyimide

PFAS (Per-and polyfluoroalkyl substances)

Test Items	Unit	Test Method	MDL	Results
2-Propenoic acid, 2-methyl-, 2-[methyl[(1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluorohexyl)sulfonyl]amino]ethyl ester (MeFHxSEMA)	µg/kg	With reference to EN 17681-1:2025, HPLC-MS-MS/GC-MS	200	N.D.

VOCs(Volatile Organic Compounds)

Test Items	Unit	Test Method	MDL	Results
m,p-Xylene	mg/kg	With reference to EPA 5021A:2014/EPA 8260D:2018, HS-GC/MS	2	N.D.
o-Xylene	mg/kg	With reference to EPA 5021A:2014/EPA 8260D:2018, HS-GC/MS	1	N.D.

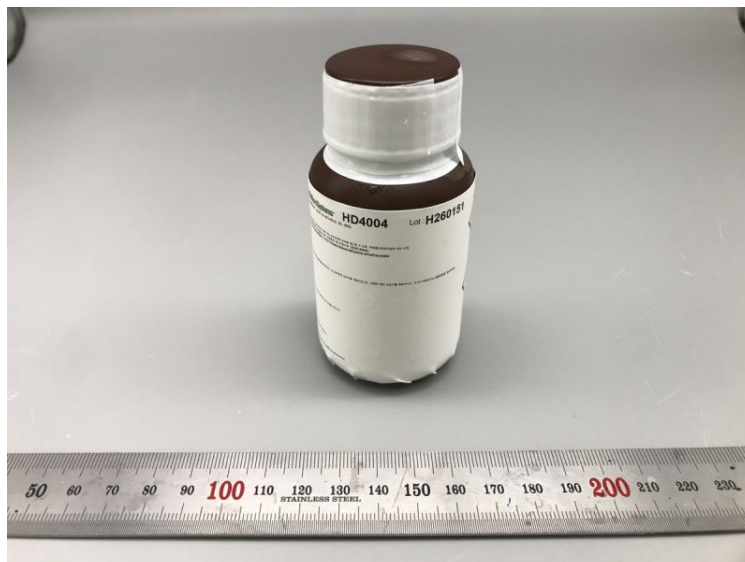
Other(s)

Test Items	Unit	Test Method	MDL	Results
N-Methylpyrrolidone	mg/kg	In-House , GC/MS	5	525000

- 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 result of Hexavalent Chromium (Cr(VI)) is "ND" as the result of Chromium (Cr) is "ND", and confirmation test of Hexavalent Chromium (Cr(VI)) is not required.
b. If the content of Total Chromium (Cr) is greater than the MDL of Hexavalent Chromium (Cr(VI)), it is the result of hexavalent Chromium by UV-VIS.
 - (8) ++ = a. The sample is positive for Cr VI if the Cr VI concentration is greater than 0.13 µg/cm².
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/cm²).
The coating is considered a non-Cr VI based coating.
c. The result between 0.10 µg/cm² and 0.13 µg/cm² is considered to be inconclusive – unavoidable coating variations may influence the determination.

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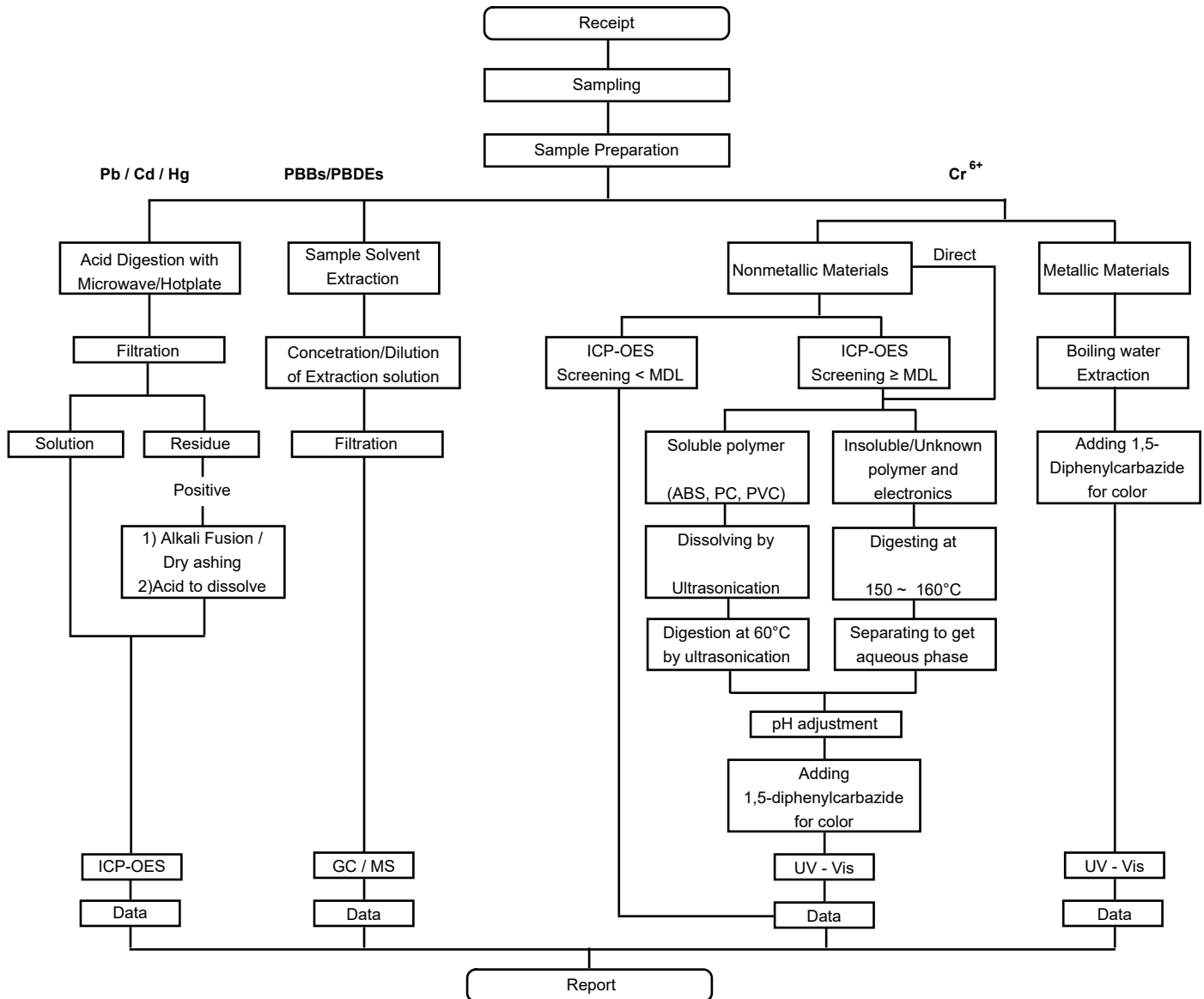
Picture of Sample as Received:



AYAA26-23048.001

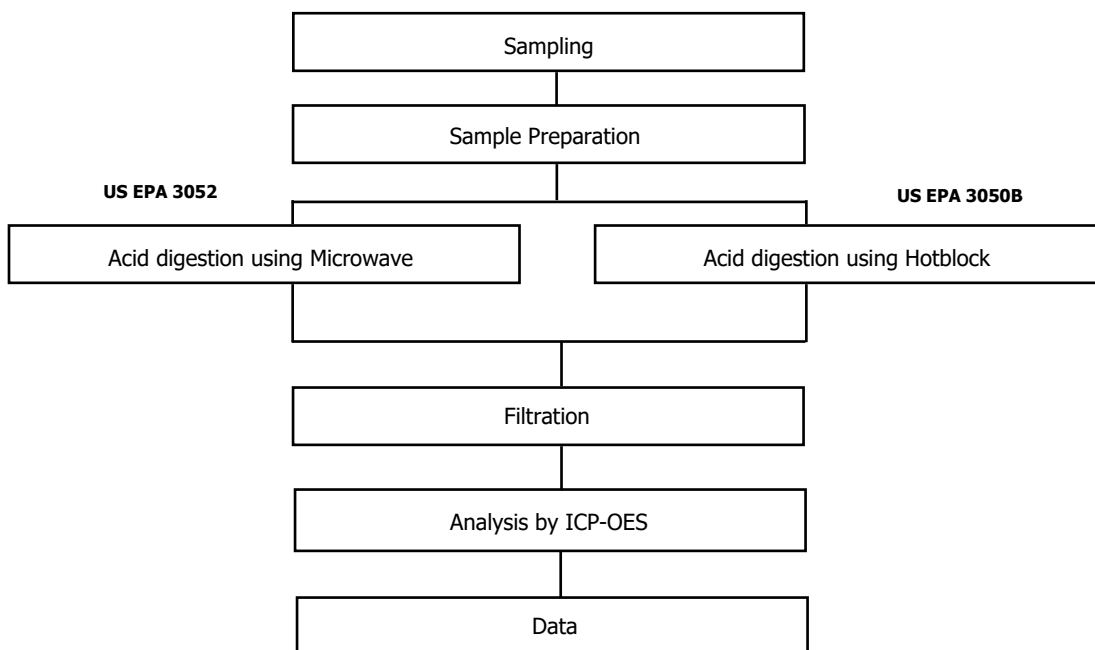
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Flow Chart for RoHS Pb / Cd / Hg / Cr⁶⁺ / PBBs&PBDEs Test



The samples were dissolved totally at the acid digestion step of the above flow chart for Cd, Pb, Hg.

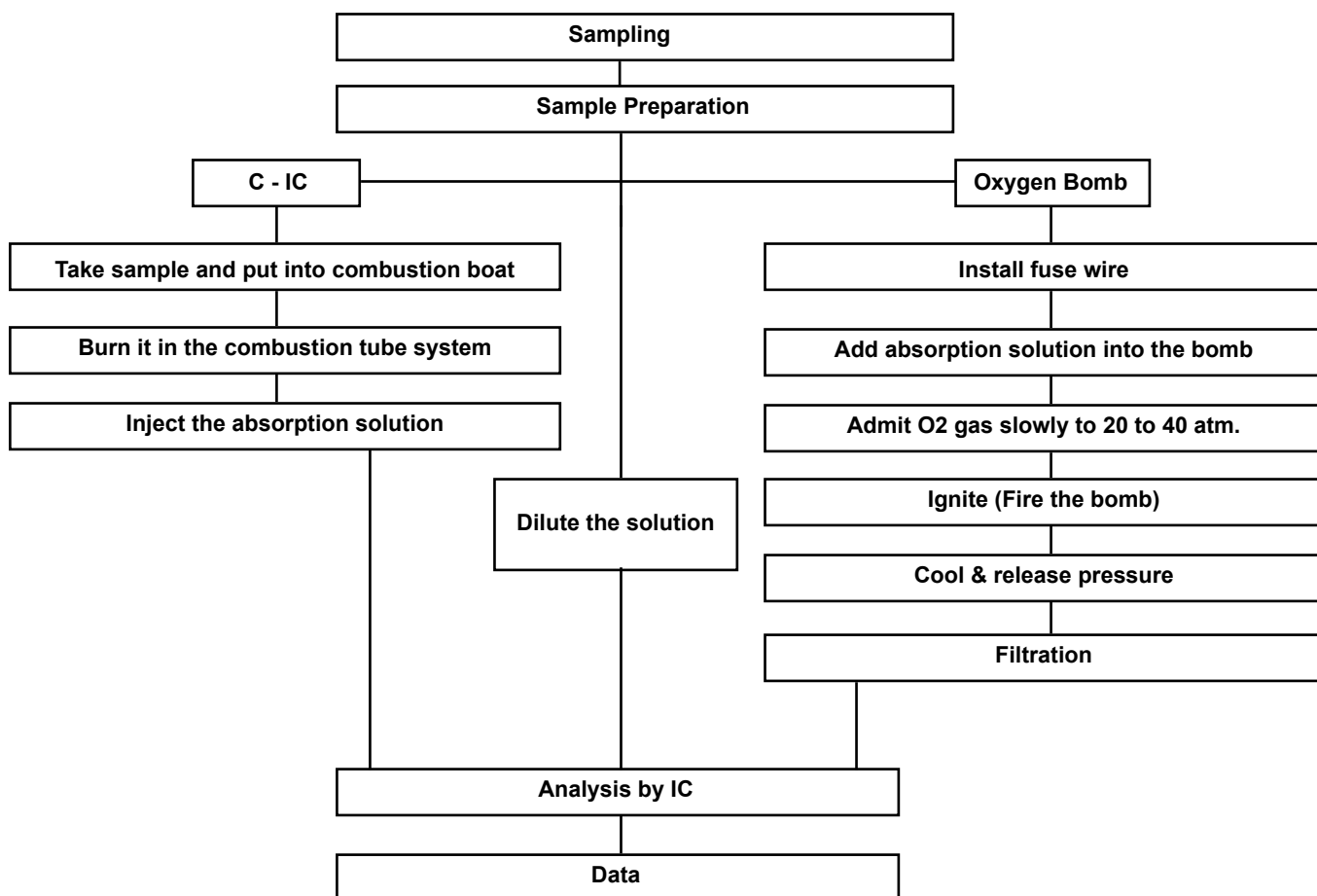
Flow Chart for Heavy metal



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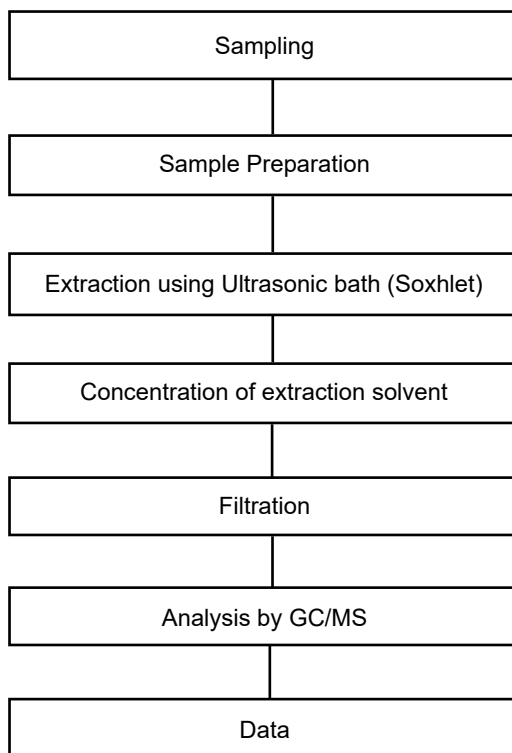
Flow Chart for Halogen Test



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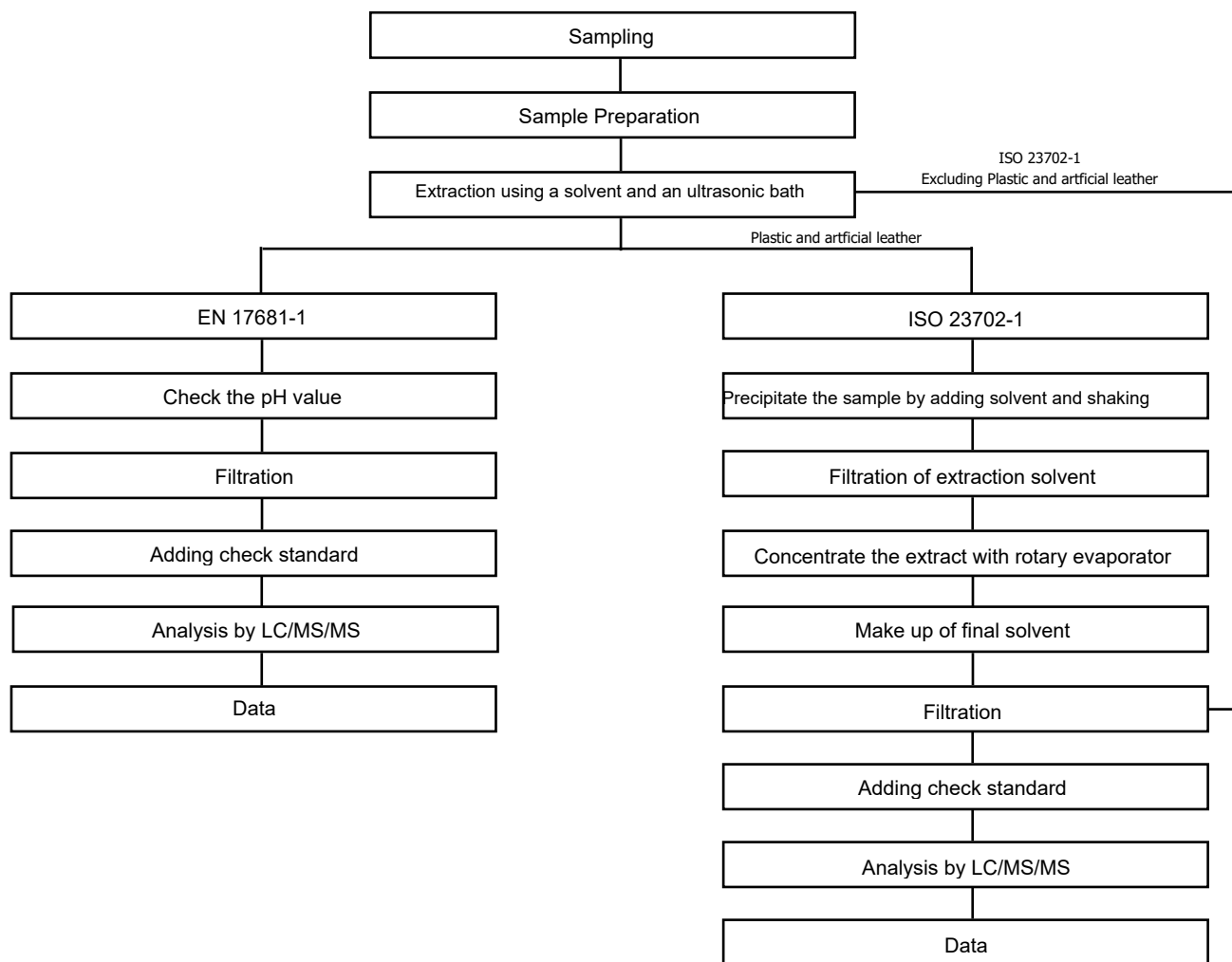


Flow Chart for IEC Phthalates



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Flow Chart for PFAS (All material)



*** End of Report ***

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