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TEST REPORT Number : WUXH00123860

Applicant : MATERION ADVANCED MATERIALS TECHNOLOGIES AND SERVICES SUZHOU LTD.
NO 28, SU TONG RD, SUZHOU INDUSTRIAL PARK, 215021, CHINA.
Attn : JENNY YAO

Date : Dec 20, 2021

Sample Description As Declared:
One (1) Piece Of Submitted Sample Said To Be :
Item Name : Ti.

Tests Conducted:
As Requested By The Applicant, For Details Refer To Attached Pages

Conclusion:

Tested Samples	Standard	Result
Submitted Sample	Restriction of the use of certain hazardous substance in electrical and electronic equipment (RoHS Directive 2011/65/EU and (EU) 2015/863)	Pass

Prepared And Checked By:
For Intertek Testing Services Wuxi Ltd.

Peter Chen
General Manager

INTERTEK TESTING SERVICES WUXI LTD. 无锡天祥质量技术服务有限公司 检验检测专用章

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Tests Conducted (As Requested By The Applicant)

1 RoHS Chemical Test

(A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (mg/kg)	ND
Lead (Pb) Content (mg/kg)	ND
Mercury (Hg) Content (mg/kg)	ND
Chromium (VI)(Cr^{6+}) Result (By Boiling Water Extraction on Metal) ($\mu g/cm^2$)	N
Polybrominated Biphenyls (PBBs) Content (mg/kg)	
Monobromobiphenyl (MonoBB)	ND
Dibromobiphenyl (DiBB)	ND
Tribromobiphenyl (TriBB)	ND
Tetrabromobiphenyl (TetraBB)	ND
Pentabromobiphenyl (PentaBB)	ND
Hexabromobiphenyl (HexaBB)	ND
Heptabromobiphenyl (HeptaBB)	ND
Octabromobiphenyl (OctaBB)	ND
Nonabromobiphenyl (NonaBB)	ND
Decabromobiphenyl (DecaBB)	ND
Polybrominated Diphenyl Ethers (PBDEs) Content (mg/kg)	
Monobromodiphenyl Ether (MonoBDE)	ND
Dibromodiphenyl Ether (DiBDE)	ND
Tribromodiphenyl Ether (TriBDE)	ND
Tetrabromodiphenyl Ether (TetraBDE)	ND
Pentabromodiphenyl Ether (PentaBDE)	ND
Hexabromodiphenyl Ether (HexaBDE)	ND
Heptabromodiphenyl Ether (HeptaBDE)	ND
Octabromodiphenyl Ether (OctaBDE)	ND
Nonabromodiphenyl Ether (NonaBDE)	ND
Decabromodiphenyl Ether (DecaBDE)	ND
Phthalates Content (mg/kg)	
Bis(2-ethylhexyl)phthalate (DEHP)	ND
Butyl benzyl phthalate (BBP)	ND
Dibutyl phthalate (DBP)	ND
Diisobutyl phthalate (DIBP)	ND

mg/kg = milligram per kilogram
ND = Not detected

N = Negative = A negative test result indicated the absorbance value of testing sample solution for Cr(VI) testing is less than the absorbance value of the 0.10$\mu g/cm^2$ equivalent comparison standard solution, the Cr(VI) concentration is below the limit of quantification, then the sample is considered to be negative for Cr(VI).

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(B) RoHS Requirement:

Restricted Substances	**Limits**
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr^{6+})	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)
Phthalates (DEHP, BBP, DBP, DIBP)	0.1% (1000 mg/kg)

The above limits were quoted from 2011/65/EU and (EU) 2015/863 for homogeneous material.

(C) Test Method:

Testing Item	**Testing Method**	**Reporting Limit**
Cadmium (Cd) Content	With reference to IEC 62321-5 Edition 1.0:2013, by acid digestion until the tested sample was totally dissolved and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321-5 Edition 1.0:2013, by acid digestion until the tested sample was totally dissolved and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	With reference to IEC 62321-4 Edition 1.1:2017, by acid digestion until the tested sample was totally dissolved and determined by ICP - OES	2 mg/kg
Chromium (VI) (Cr^{6+}) Content	With reference to IEC 62321-7-1 Edition 1.0:2015, by boiling water extraction and determined by UV-VIS Spectrophotometer.	Positive(>0.13μg/cm^2) / Negative(<0.10μg/cm^2) / Inconclusive(0.10μg/cm^2 - -0.13μg/cm^2)
Polybrominated Biphenyls (PBBs)& Polybrominated Diphenyl Ethers (PBDEs) Content	With reference to IEC 62321-6 Edition 1.0:2015, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	5 mg/kg
Phthalates (DEHP, BBP, DBP, DIBP) Content	With reference to IEC 62321-8 Edition 1.0:2017,by solvent extraction and determined by GC/MS	50 mg/kg

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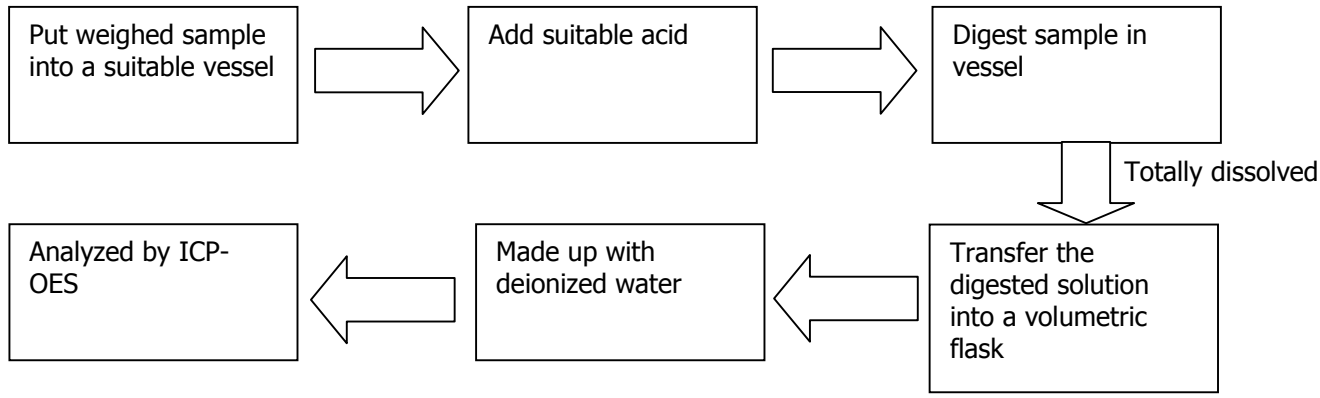
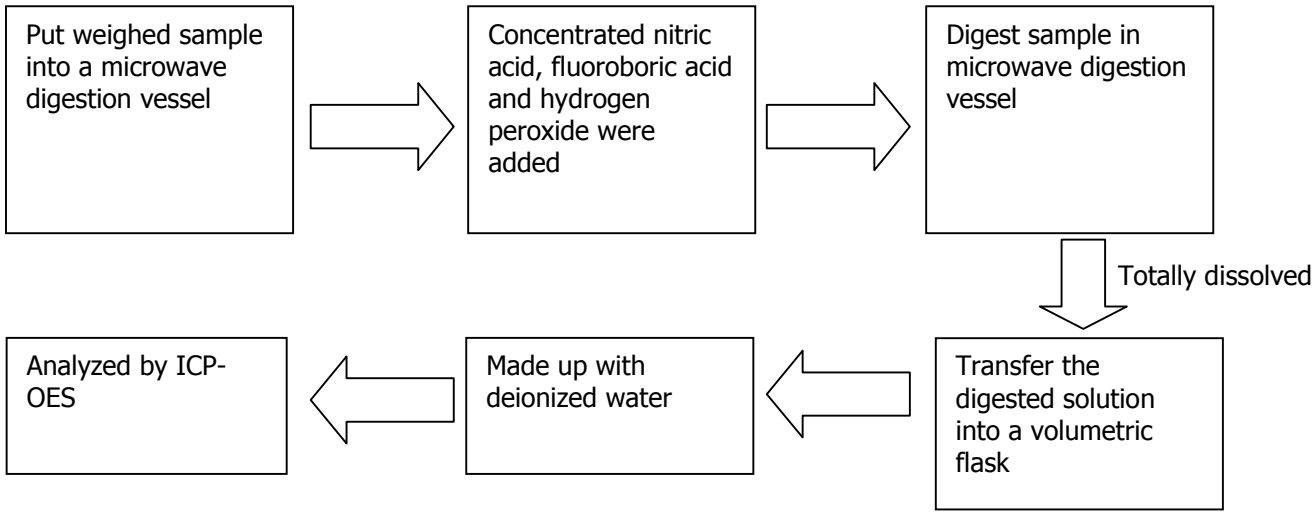
Tests Conducted (As Requested By The Applicant)

(D) Measurement Flowchart:

1. Test for Cd/Pb Contents



2. Test for Hg Content



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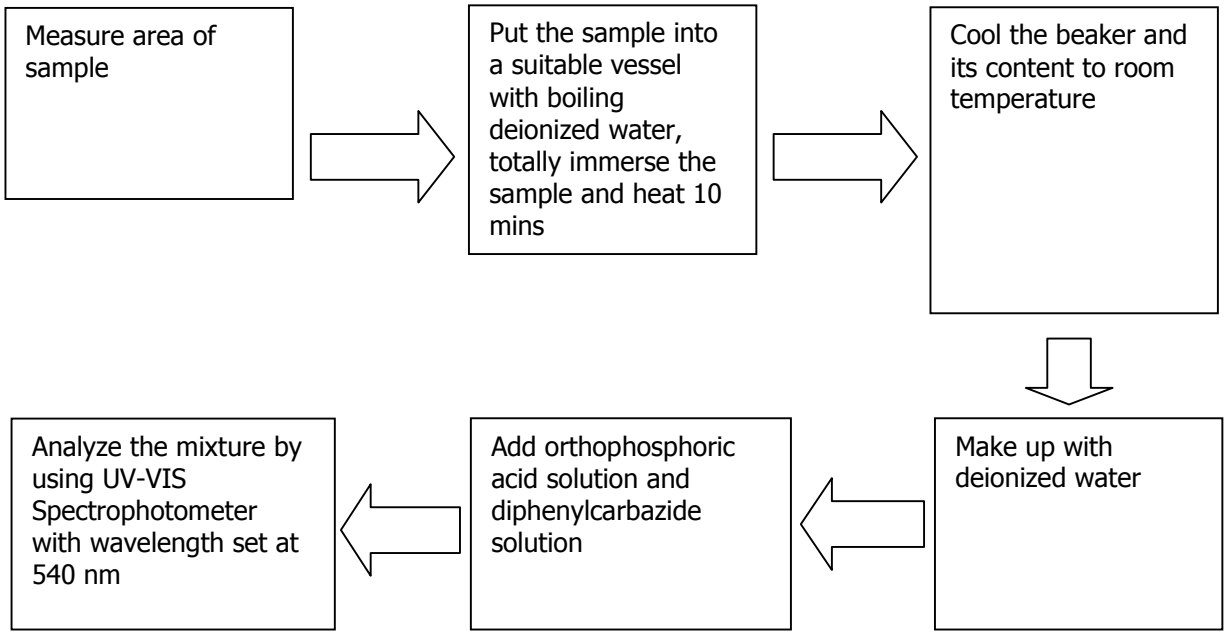
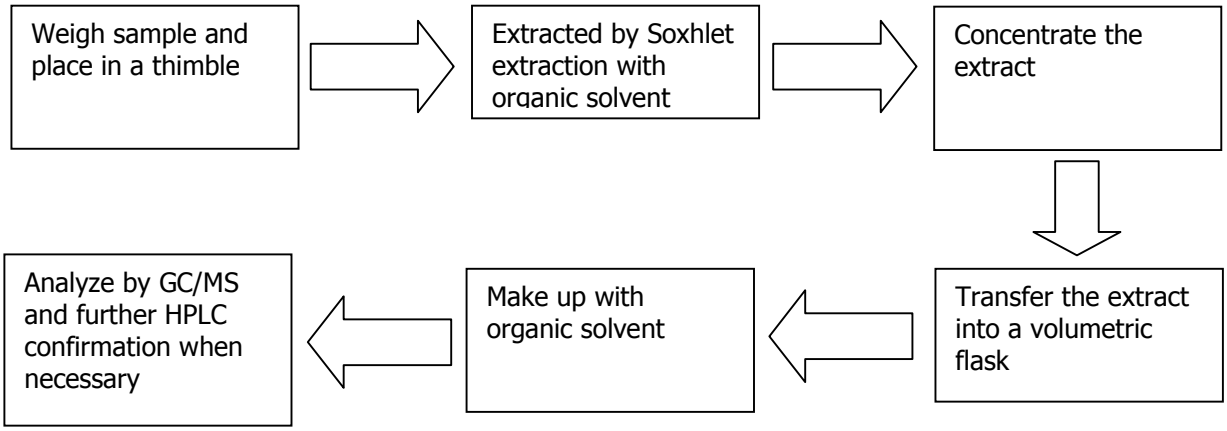
Tests Conducted (As Requested By The Applicant)

3. Test for Chromium (VI) (Cr^{6+}) Content (Boiling Water Extraction)



4. Test for PBBs/PBDEs Contents



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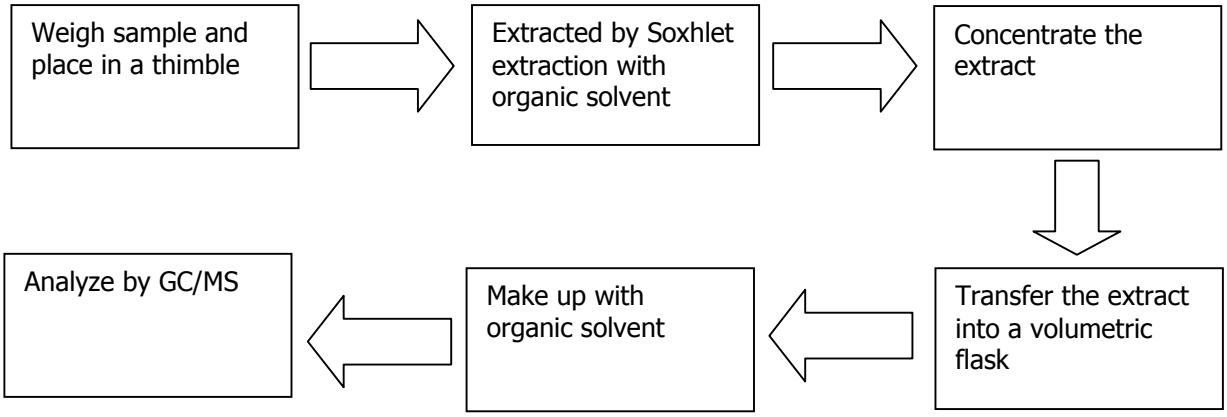
Tests Conducted (As Requested By The Applicant)

5. Test for Phthalate Contents



2 Total Antimony(Sb) / Beryllium(Be) Content

With Reference To USEPA 3052, Acid Digestion Method Was Used And Total Antimony(Sb) / Beryllium(Be) Content Was Determined By Inductively Coupled Argon Plasma Spectrometry.

	Result In ppm
Antimony(Sb)	Beryllium(Be)
ND	ND

ppm = Parts Per Million =mg/kg
Detection Limit= 2 ppm
ND=Not Detected

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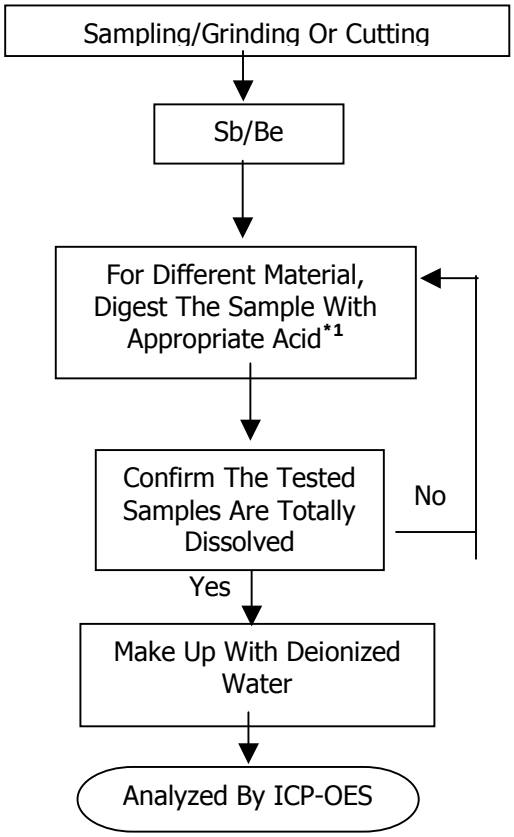
Tests Conducted (As Requested By The Applicant)

Measurement Flowchart:



Remarks:

*1: List Of Appropriate Acid：

Material	Acid Added For Digestion
Polymers	HNO_3,HCL,HF,H_2O_2,H_3BO_3
Metals	HNO_3,HCL,HF
Electronics	HNO_3,HCL,H_2O_2,HBF_4

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Tests Conducted (As Requested By The Applicant)

3 Perfluorooctane Sulfonates (PFOS) And Perfluorooctanoic Acid (PFOA) Content:

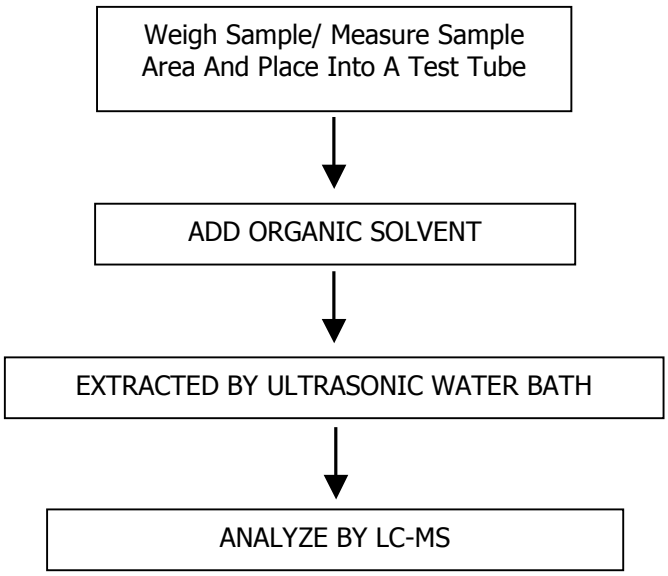
With Reference To EPA 3550C & CEN/TS 15968, By Solvent Extraction And Followed By Liquid Chromatography-Mass Spectrometric (LC-MS) Analysis.

Compound	Result(ppm)
Perfluorooctane Sulfonates	ND
Perfluorooctanoic Acid	ND

Remark : ND = Not Detected
ppm = Parts Per Million = mg/kg
Detection Limit = 0.025 ppm

Date Sample Received: Dec 13, 2021
Testing Period: Dec 13, 2021 To Dec 17, 2021

Measurement Flowchart:
Test For **Perfluorooctane Sulfonates(PFOS)Andperfluorooctanoic Acid (PFOA)** Content:



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Tests Conducted (As Requested By The Applicant)

4 HBCDD (Hexabromocyclododecane)

(A) Test Result Summary:

Testing Item	Result(ppm)
HBCDD (Hexabromocyclododecane)	ND

Remark:
ppm = Parts Per Million = mg/kg
ND = Not Detected

(B) Test Method :

Testing Item	Testing Method	Reporting Limit
HBCDD (Hexabromocyclododecane)	With Reference To US EPA 3540C, By Liquid Chromatography-Tandem Mass Spectrometry (LC-MS) analysis	10 ppm

Date Sample Received: Dec 13, 2021
Testing Period: Dec 13, 2021 To Dec 17, 2021

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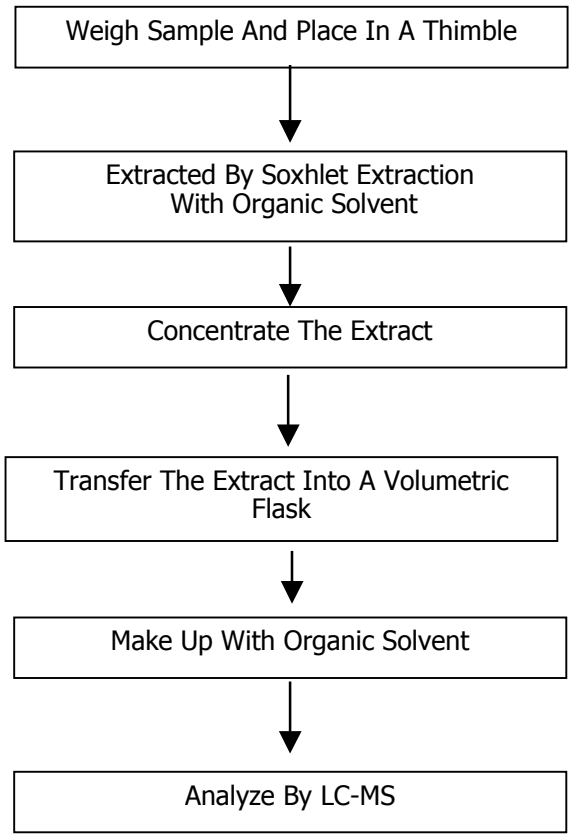
Measurement Flowchart:

Test For HBCDD (Hexabromocyclododecane) Content



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Tests Conducted (As Requested By The Applicant)

5 Test Result Summary:

Testing Item	Result(ppm)
TBBPA(Tetrabromobisphenol A)	ND

Remark:
ppm = Parts Per Million = Mg/Kg
ND = Not Detected

(B) Test Method :

Testing Item	Testing Method	Reporting Limit
TBBPA(Tetrabromobisphenol A)	With Reference To US EPA 3540C, By Solvent Extraction And Determined By GC-MSD	10 ppm

Date Sample Received: Dec 13, 2021
Testing Period: Dec 13, 2021 To Dec 17, 2021

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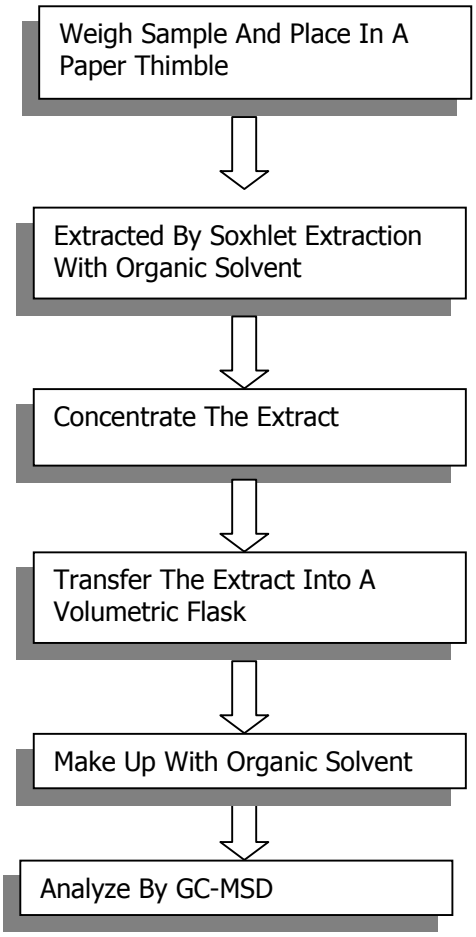
Tests Conducted (As Requested By The Applicant)
Measurement Flowchart
Test For TBBPA Content:



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Tests Conducted (As Requested By The Applicant)

6 Phthalate Content Test

With Reference To EN14372, By Gas Chromatography-Mass Spectrometry (GC-MS) Analysis.

Tested Compound	Result (In ppm)
Di-Iso-Decyl Phthalate (DIDP)	ND
Di-N-Hexyl Phthalate (DNHP)	ND
Bis(2-methoxyethyl)phthalate (DMEP)	ND
Di-isopentylphthalate (DIPP)	ND
D-pentyl iso-pentylphthalate (NPIPP)	ND
Dipentyl phthalate (DNPP)	ND
Bis(2-methoxyethyl)phthalate (BMEP)	ND

With Reference To IEC 62321-8:2017, By Gas Chromatography-Mass Spectrometry (GC-MS) Analysis.

Tested Compound	Result (In ppm)
Di-Iso-Nonyl Phthalate (DINP)	ND
Di-N-Octyl Phthalate (DNOP)	ND

Detection Limit = 50 ppm
ND = Not Detected
ppm = parts per million = mg/kg

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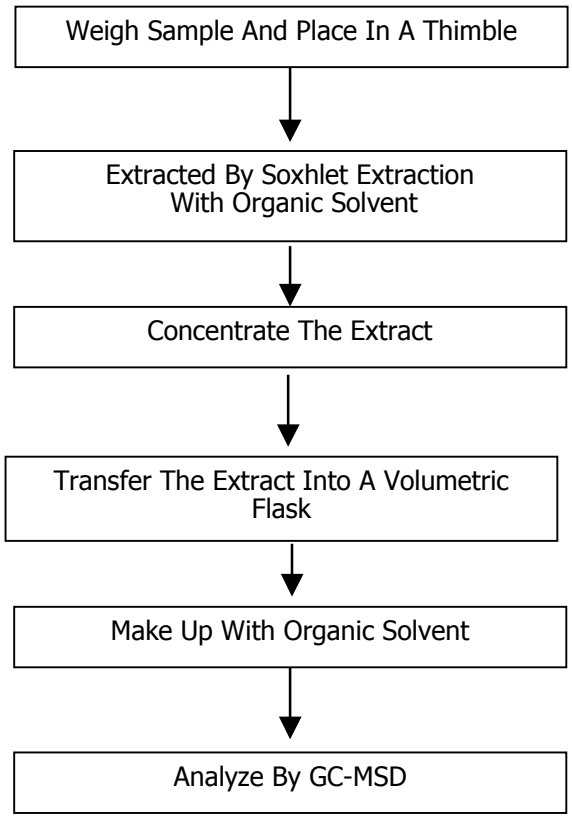
Tests Conducted (As Requested By The Applicant)
Measurement Flowchart:

Test For Phthalates Contents



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Tests Conducted (As Requested By The Applicant)

7 Halogen Test

(I) Test Result Summary :

Halogen Content:

Testing Item	Result (ppm)
	Submitted Samples
Fluorine (F) Content	ND
Chlorine (Cl) Content	ND
Bromine (Br) Content	ND
Iodine (I) Content	ND

Remarks : ppm = Parts Per Million = mg/kg
ND = Not Detected

Date Sample Received: Dec 13, 2021
Testing Period: Dec 13, 2021 To Dec 17, 2021

(II) Test Method :

Testing Item	Testing Method	Reporting Limit
Halogen (F,Cl, Br,I) Content	With Reference To BS EN 14582:2016 By Combustion In A Calorimetric Bomb And Determined By Ion Chromatography	50 ppm

Remarks : Reporting Limit = Quantitation Limit Of Analyte In Sample

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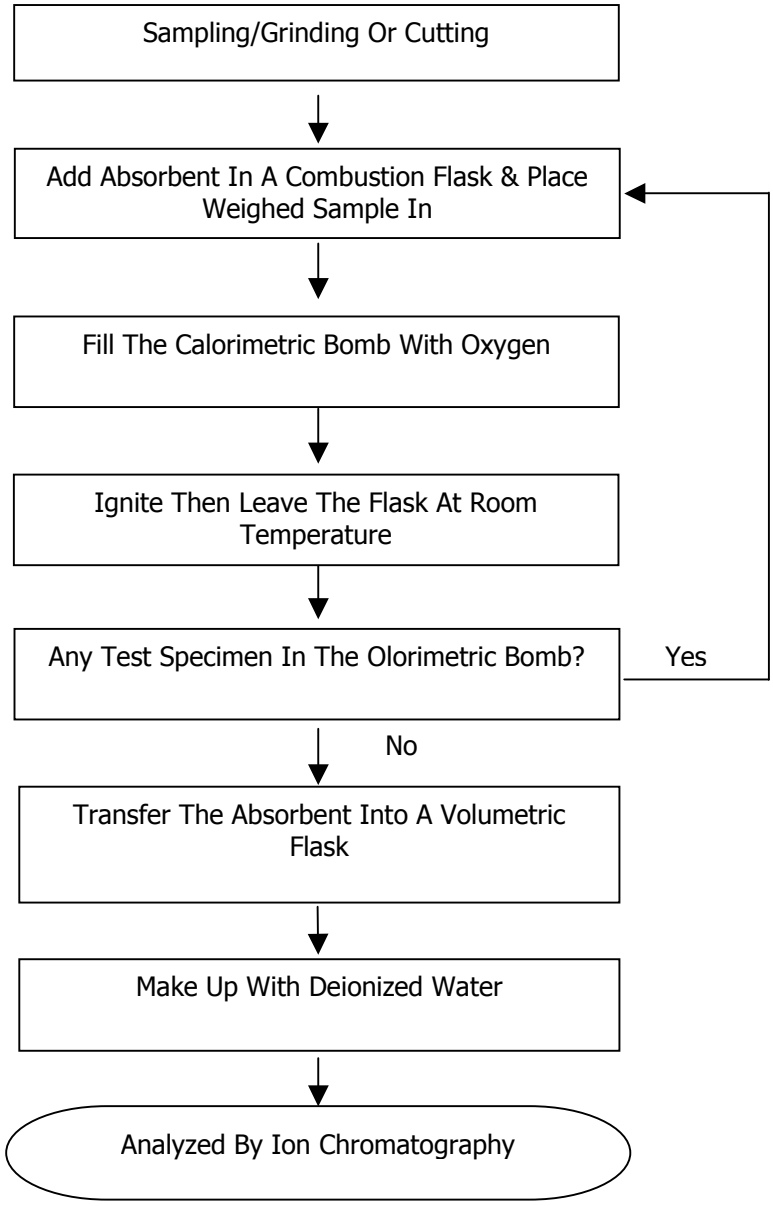
(III) Measurement Flowchart:

Test For Halogen Content Reference Method: BS EN 14582:2016



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Tests Conducted (As Requested By The Applicant)

Photo

End of Report

The statements of conformity reported have considered the decision rule agreed, namely that Intertek have taken account of measurement uncertainty as calculated by Intertek, and applied according to ILAC-G8/09:2019 (Non-binary acceptance based on guard band w = U) except designation from the customer, regulation or test specification. This decision rule only applies to the numeric test results.
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