

TEST REPORT

Number : WUXH00096158

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

Date : Dec 24, 2019

Sample Description As Declared:

One (1) Piece Of Submitted Sample Said To Be : **Copper Metal.**
Item Name : Cu.

Tests Conducted:

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

Conclusion:

<u>Tested Sample</u>	<u>Standard</u>	<u>Result</u>
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



TEST REPORT

Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)

1 RoHS Chemical Test

(A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (ppm)	ND
Lead (Pb) Content (ppm)	ND
Mercury (Hg) Content (ppm)	ND
Chromium (VI)(Cr ⁶⁺) Result (By Boiling Water Extraction on Metal) (µg/cm ²)	N
Polybrominated Biphenyls (PBBs) Content (ppm)	
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 (ppm)	
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 (ppm)	
Bis(2-ethylhexyl)phthalate (DEHP)	ND
Butyl benzyl phthalate (BBP)	ND
Dibutyl phthalate (DBP)	ND
Diisobutyl phthalate (DIBP)	ND

ppm = Parts Per Million = mg/kg

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 0.10µg/cm² 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).



TEST REPORT

Number : WUXH00096158

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(B) RoHS Requirement:

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

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 ppm
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 ppm
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 ppm
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 ppm
Phthalates (DEHP, BBP, DBP, DIBP) Content	With reference to IEC 62321-8 Edition 1.0:2017, by solvent extraction and determined by GC/MS	50ppm

Date Sample Received: Dec 13, 2019

Testing Period: Dec 13, 2019 To Dec 24, 2019



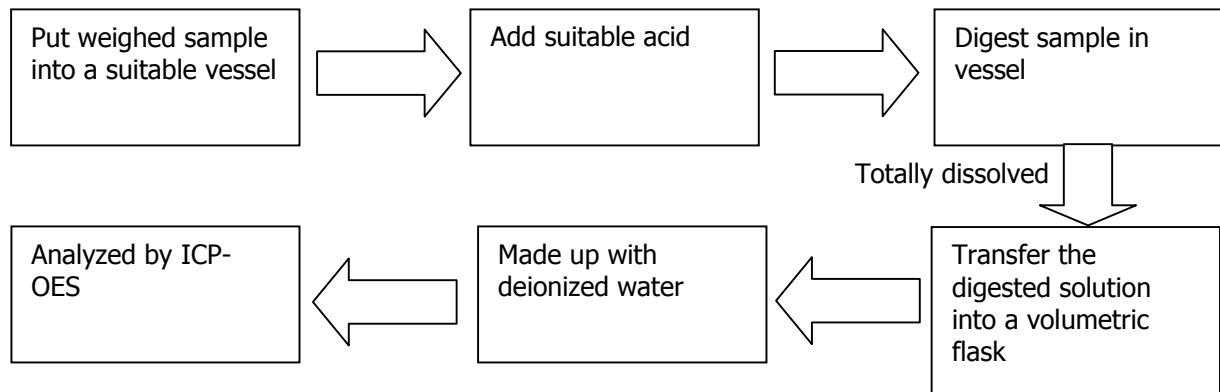
TEST REPORT

Number : WUXH00096158

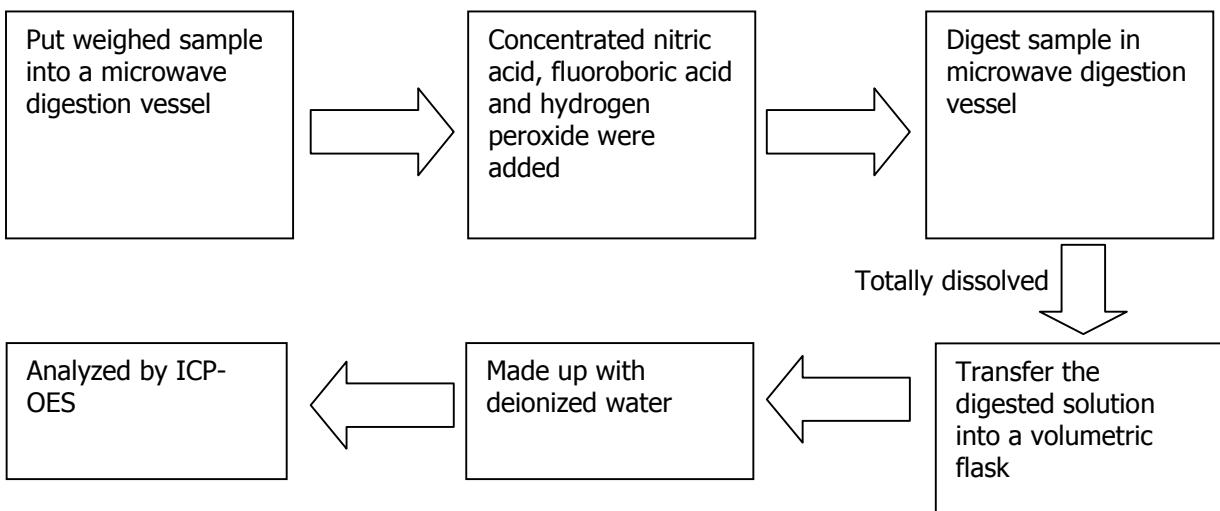
Tests Conducted (As Requested By The Applicant)

(D) Measurement Flowchart:

1. Test for Cd/Pb Contents



2. Test for Hg Content

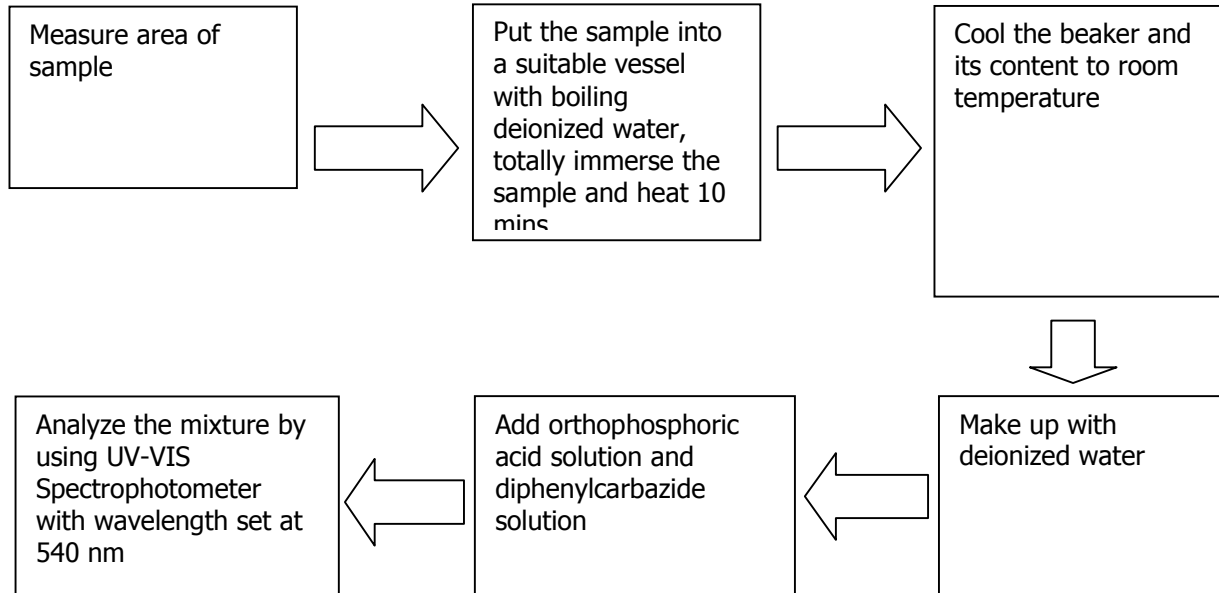


TEST REPORT

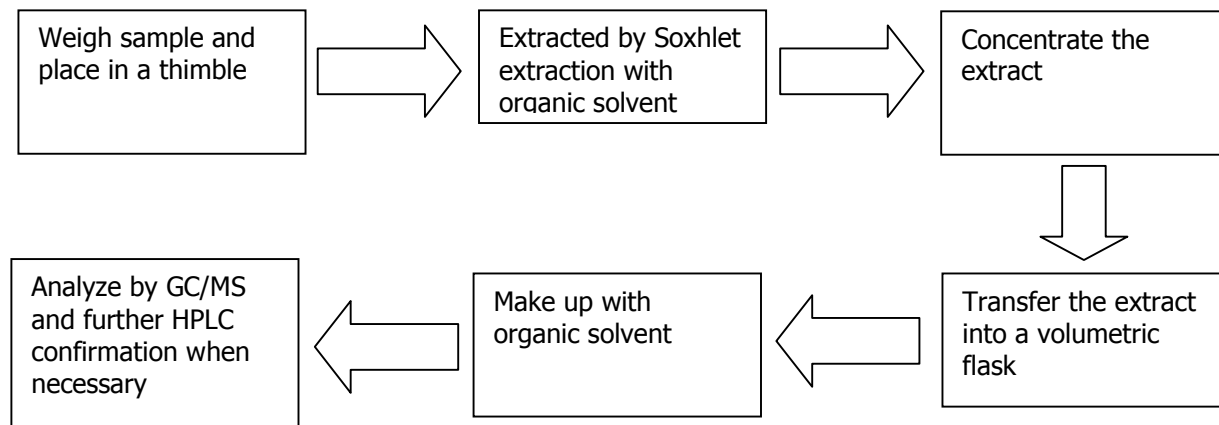
Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)

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



4. Test for PBBs/PBDEs Contents

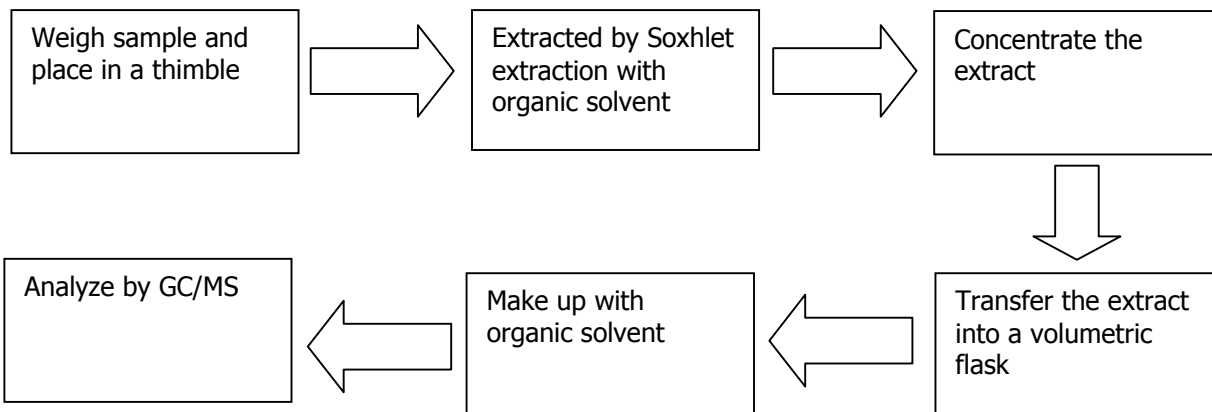


TEST REPORT

Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)

5. Test for Phthalate Contents



TEST REPORT

Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)

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.

	<u>Result In ppm</u>
Sb	ND
Be	ND

ppm = Parts Per Million =mg/kg

ND = Not Detected

Detection Limit= 2ppm

Date Sample Received: Dec 13, 2019

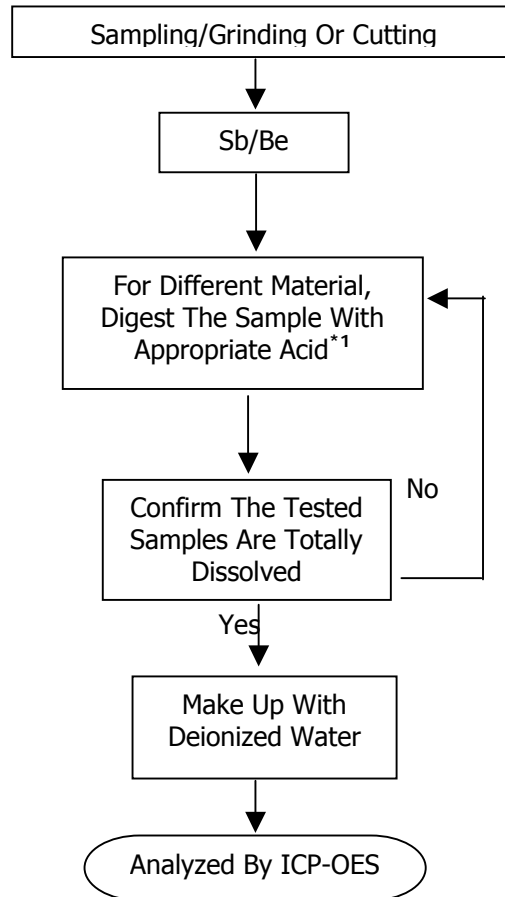
Testing Period: Dec 13, 2019 To Dec 24, 2019



TEST REPORT

Number : WUXH00096158

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 ₂ O ₂ ,H ₃ BO ₃
Metals	HNO ₃ ,HCL,HF
Electronics	HNO ₃ ,HCL,H ₂ O ₂ ,HBF ₄

*2: If The Result Of Spot Test Is Positive, Chromium VI Would Be Determined As Detected.



TEST REPORT

Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)

3 Test Result Summary:

<u>Testing Item</u>	<u>Result(ppm)</u>
TBBPA(Tetrabromobisphenol A)	ND

Remarks:

ppm = Parts Per Million = Mg/Kg

ND = Not Detected

(B) Test Method :

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
TBBPA(Tetrabromobisphenol A)	With Reference To US EPA 3540C, By Solvent Extraction And Determined By LCMS/MS	10 ppm

Date Sample Received: Dec 13, 2019

Testing Period: Dec 13, 2019 To Dec 24, 2019

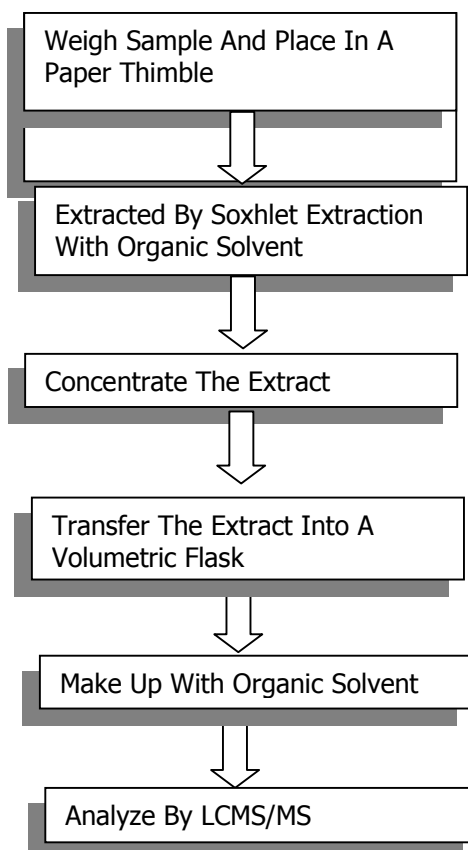


TEST REPORT

Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)
Measurement Flowchart

Test For TBBPA Content:



TEST REPORT

Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)

4 HBCDD (Hexabromocyclododecane)

(A) Test Result Summary:

Testing Item	Result(ppm)
HBCDD (Hexabromocyclododecane)	ND

Remarks:

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, 2019

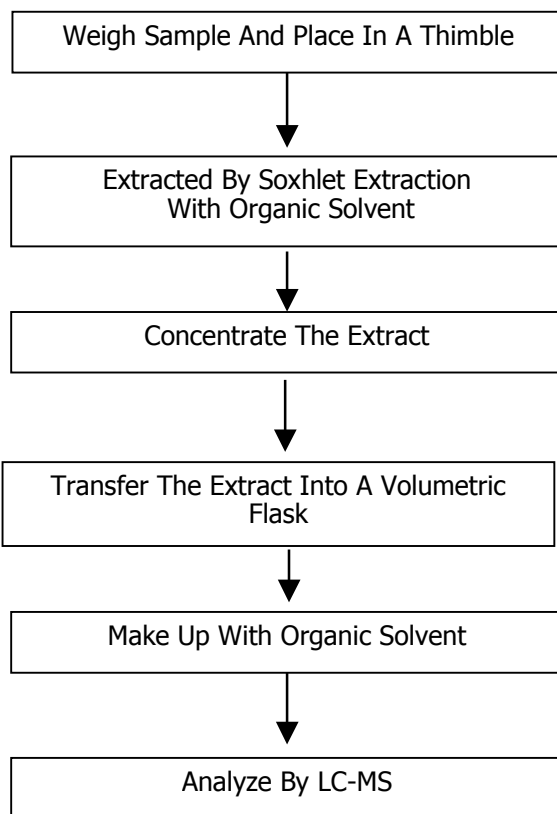
Testing Period: Dec 13, 2019 To Dec 24, 2019



TEST REPORT

Number : WUXH00096158

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



TEST REPORT

Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)

5 Phthalate Content Test

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

<u>Tested Compound</u>	<u>Result (In ppm)</u>
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.

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

Detection Limit = 50ppm
ND = Not Detected

Date Sample Received: Dec 13, 2019
Testing Period: Dec 13, 2019 To Dec 24, 2019

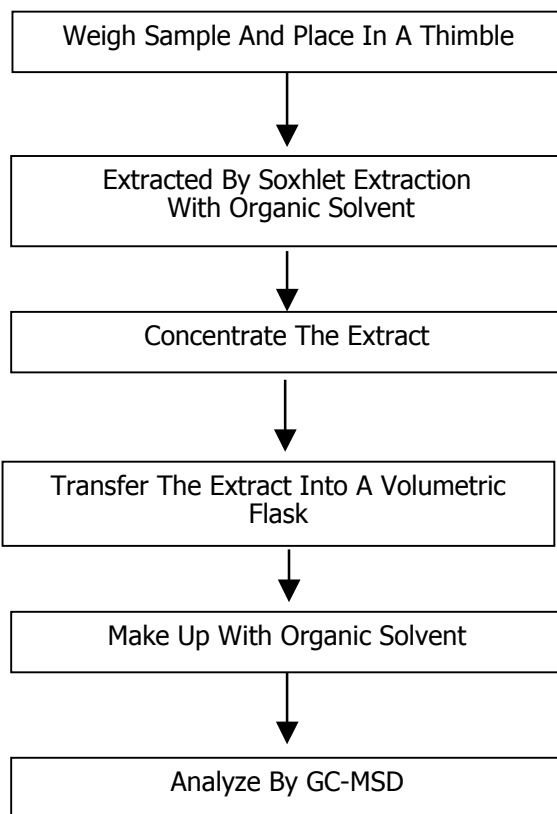


TEST REPORT

Number : WUXH00096158

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

Test For Phthalates Contents



TEST REPORT

Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)

6 Halogen Test

(I) Test Result Summary :

Halogen Content:

<u>Testing Item</u>	<u>Result (ppm)</u>
	<u>Submitted Samples</u>
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, 2019

Testing Period: Dec 13, 2019 To Dec 24, 2019

(II) Test Method :

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
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

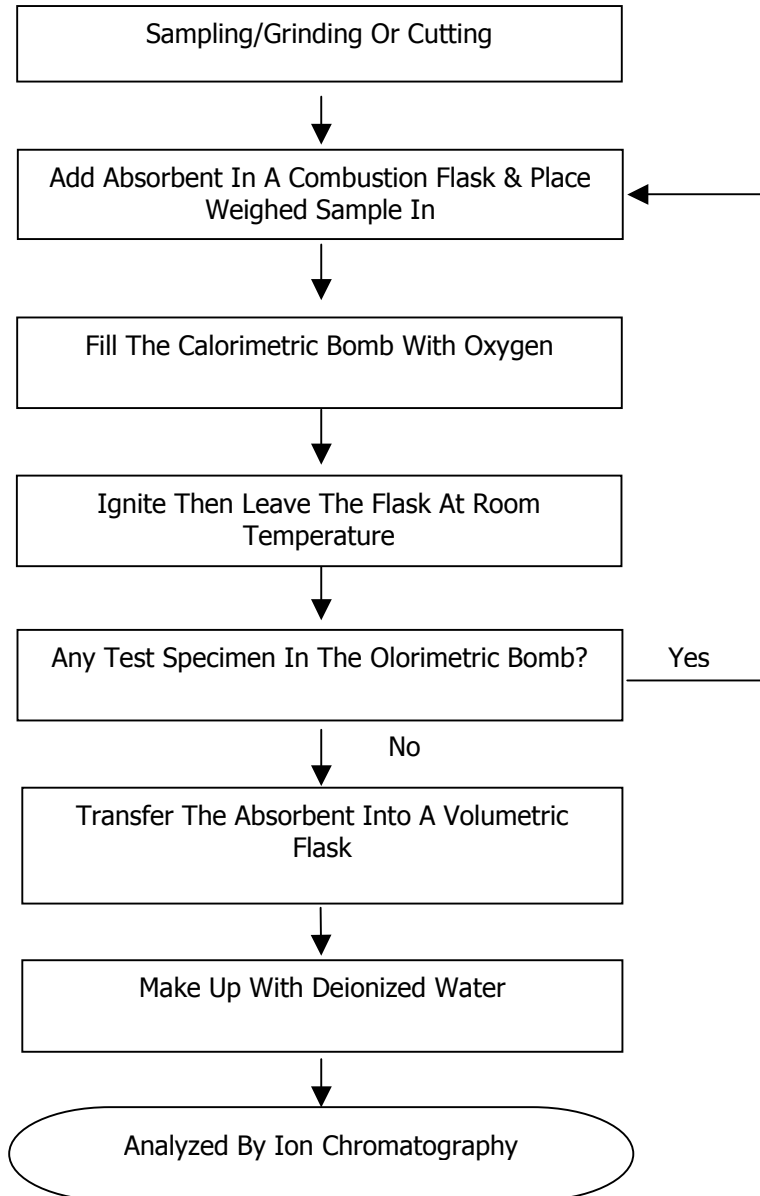
Remarks : Reporting Limit = Quantitation Limit Of Analyte In Sample



Tests Conducted (As Requested By The Applicant)

(III) Measurement Flowchart:

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



TEST REPORT

Number : WUXH00096158

Tests Conducted (As Requested By The Applicant)

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

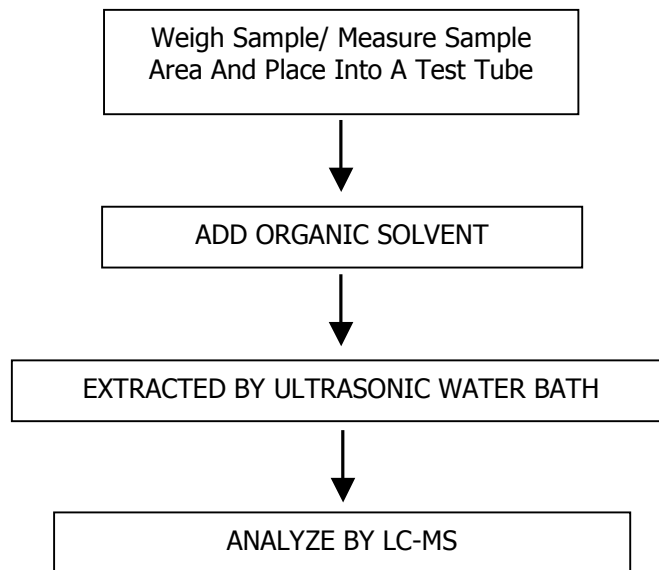
With Reference To EPA 3550C, By Solvent Extraction And Followed By Liquid Chromatography-Mass Spectrometric (LC-MS) Analysis.

Compound	<u>Result(ppm)</u>
Perfluorooctane Sulfonates	ND
Perfluorooctanoic Acid	ND

Remark : ND = Not Detected
ppm = Parts Per Million = mg/kg
Detection Limit = 1.0ppm

Date Sample Received: Dec 13, 2019
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Measurement Flowchart:
Test For Perfluorooctane Sulfonates(PFOS)Andperfluorooctanoic Acid (PFOA) Content:



TEST REPORT

Number : WUXH00096158

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Photo



End of Report

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