

TEST REPORT

Number : WUXH00123859S1

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

Date : Jan 12, 2022
This Is To Supersede Report No.
WUXH00123859 Dated Dec 20,
2021

Sample Description As Declared:

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

Tests Conducted:

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

Conclusion:

<u>Tested Samples</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



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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) (µg/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 0.10µg/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).



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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

Date Sample Received: Dec 13, 2021

Testing Period: Dec 13, 2021 To Dec 17, 2021



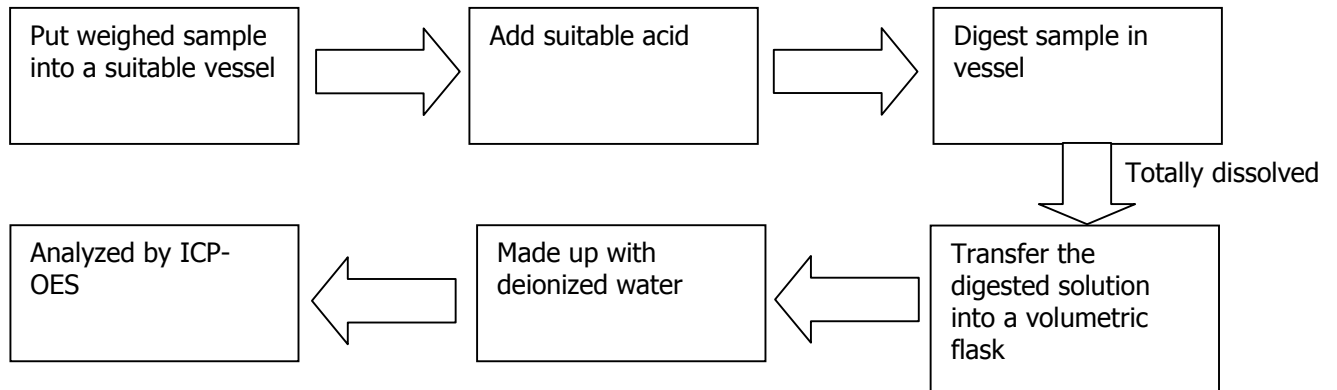
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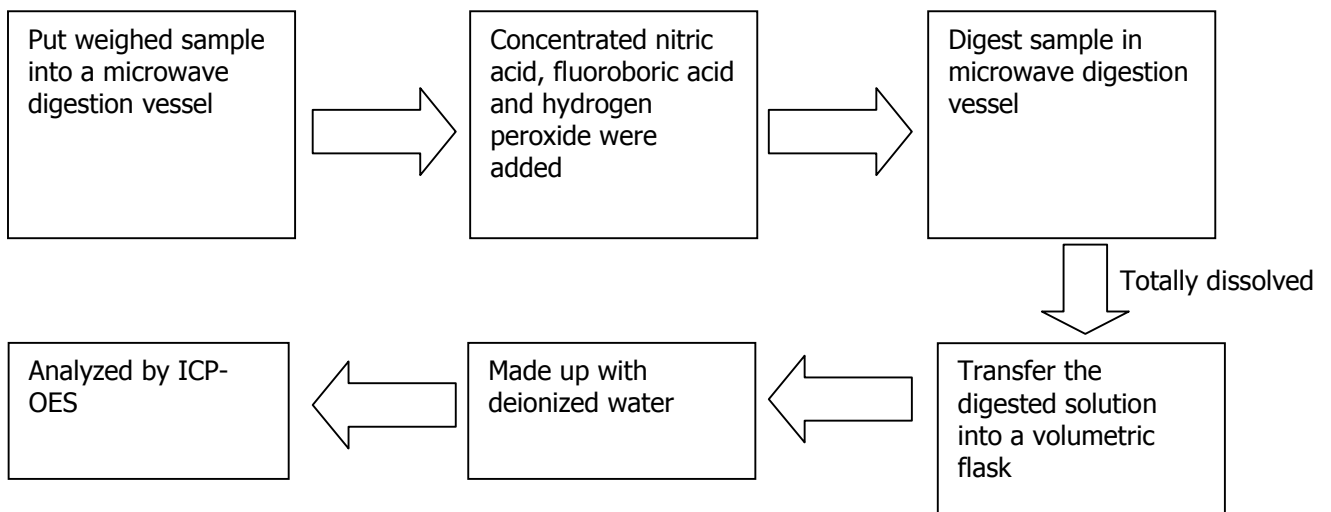
Tests Conducted (As Requested By The Applicant)

(D) Measurement Flowchart:

1. Test for Cd/Pb Contents



2. Test for Hg Content

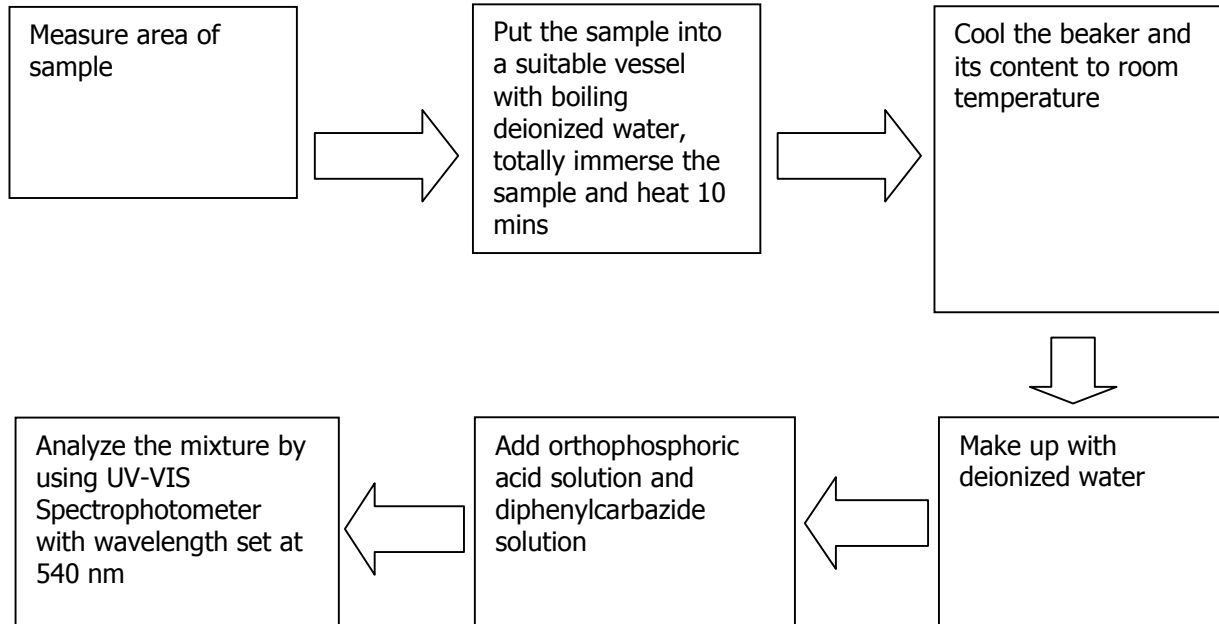


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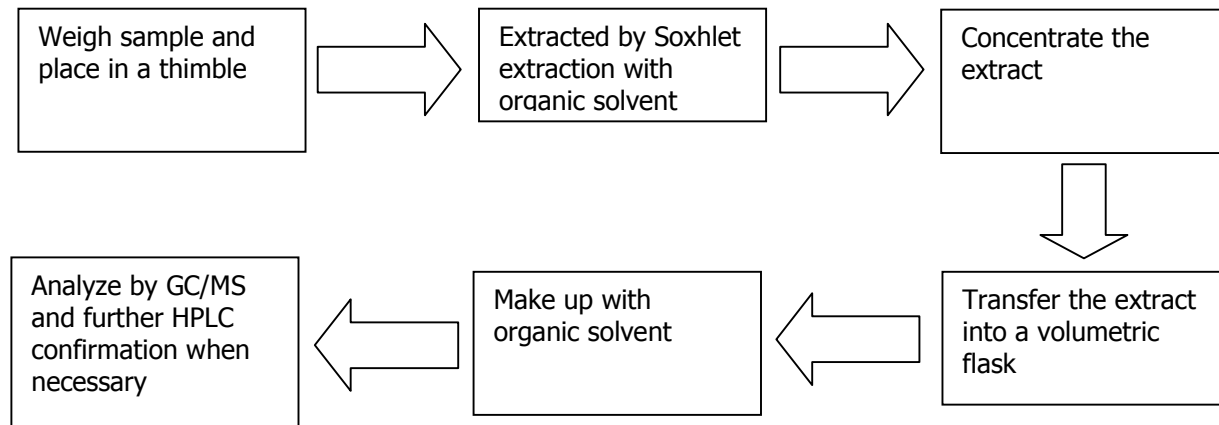
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3. Test for Chromium (VI) (Cr^{6+}) Content (Boiling Water Extraction)



4. Test for PBBs/PBDEs Contents

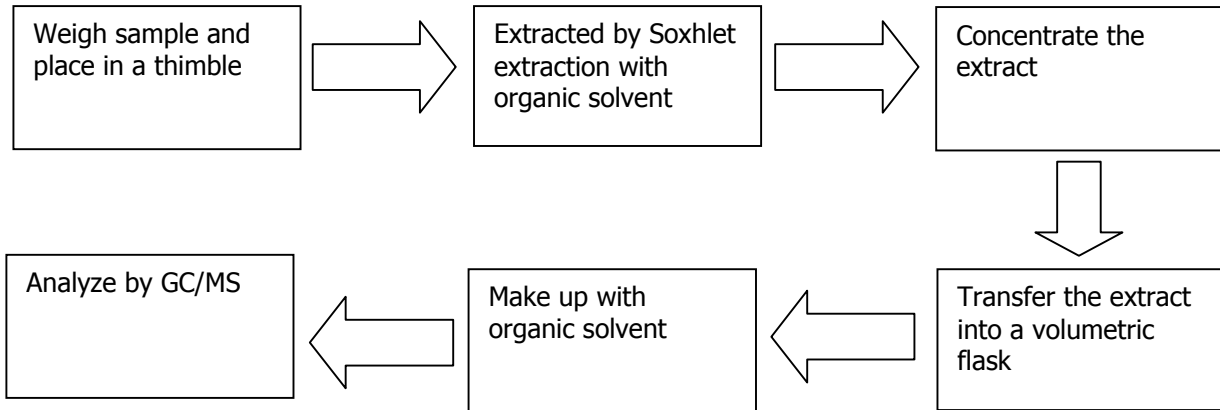


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5. Test for Phthalate Contents



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.

	<u>Result In ppm</u>	
Antimony(Sb)		Beryllium(Be)
ND		ND

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

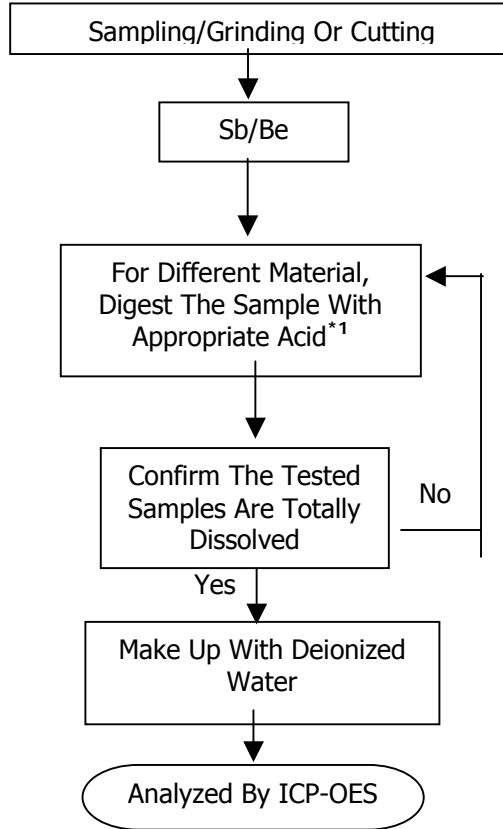
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Tests Conducted (As Requested By The Applicant)
Measurement Flowchart:



Remarks:

*1: List Of Appropriate Acid:

Material	Acid Added For Digestion
Polymers	HNO ₃ ,HCL,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO ₃ ,HCL,HF
Electronics	HNO ₃ ,HCL,H ₂ O 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

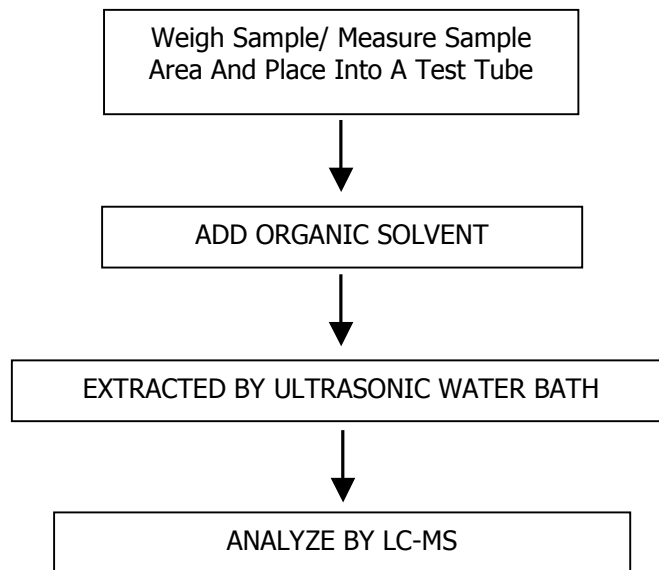
Detection Limit = 0.025 ppm

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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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 :

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

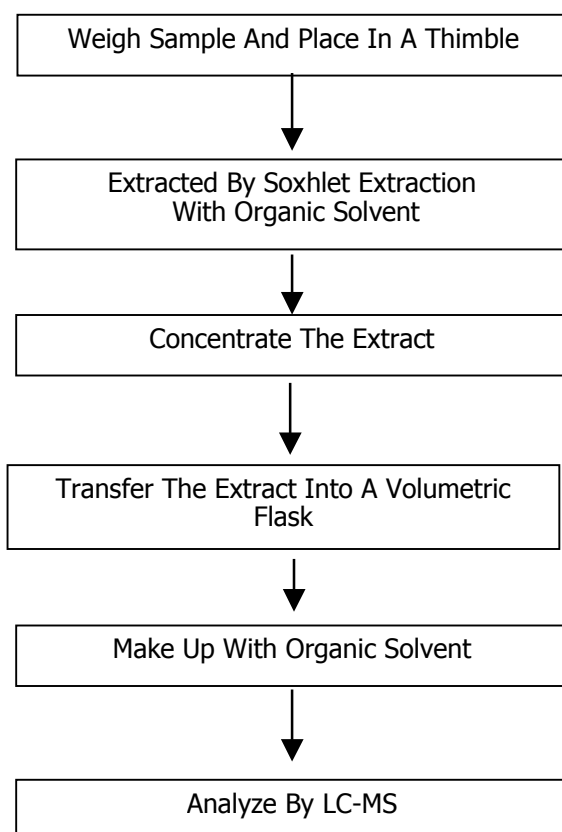
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Tests Conducted (As Requested By The Applicant)
Measurement Flowchart:
Test For HBCDD (Hexabromocyclododecane) Content



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5 Test Result Summary:

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

Remark:

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 GC-MSD	10 ppm

Date Sample Received: Dec 13, 2021

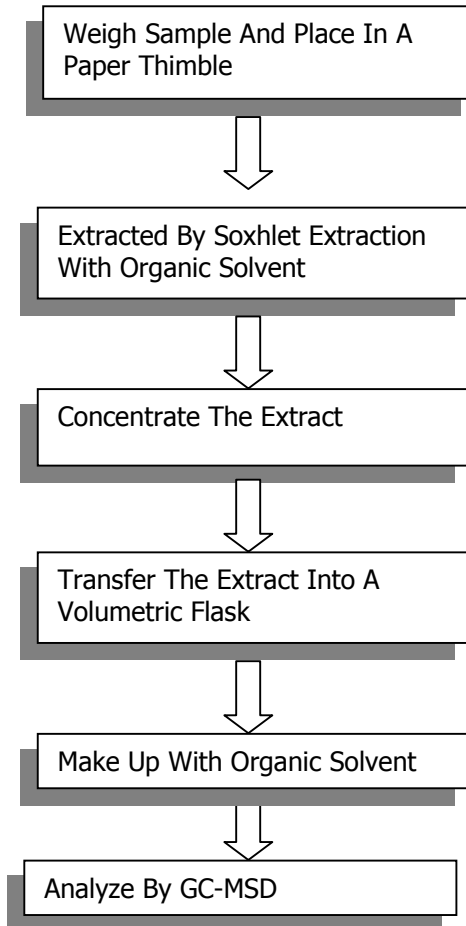
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Tests Conducted (As Requested By The Applicant)
Measurement Flowchart
Test For TBBPA Content:



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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.

<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 = 50 ppm

ND = Not Detected

ppm = parts per million = mg/kg

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Testing Period: Dec 13, 2021 To Dec 17, 2021

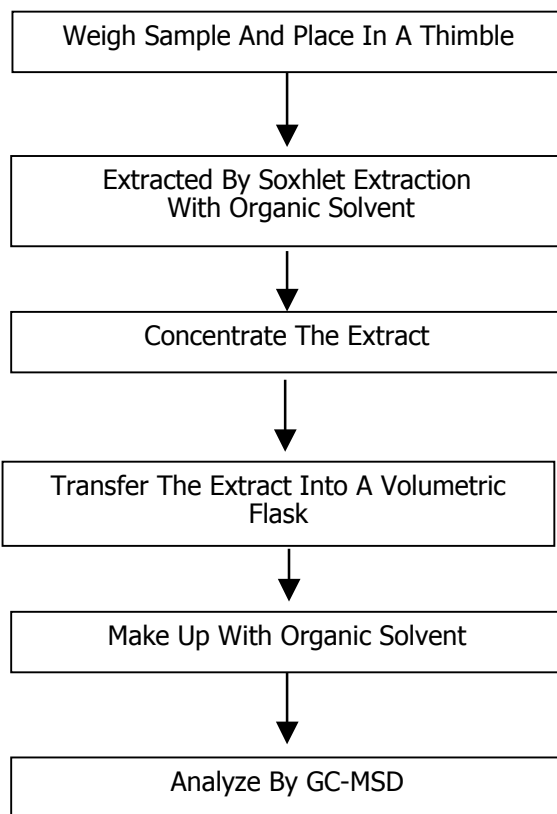


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Tests Conducted (As Requested By The Applicant)
Measurement Flowchart:

Test For Phthalates Contents



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Tests Conducted (As Requested By The Applicant)

7 Halogen Test

(I) Test Result Summary :

Halogen Content:

<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, 2021

Testing Period: Dec 13, 2021 To Dec 17, 2021

(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

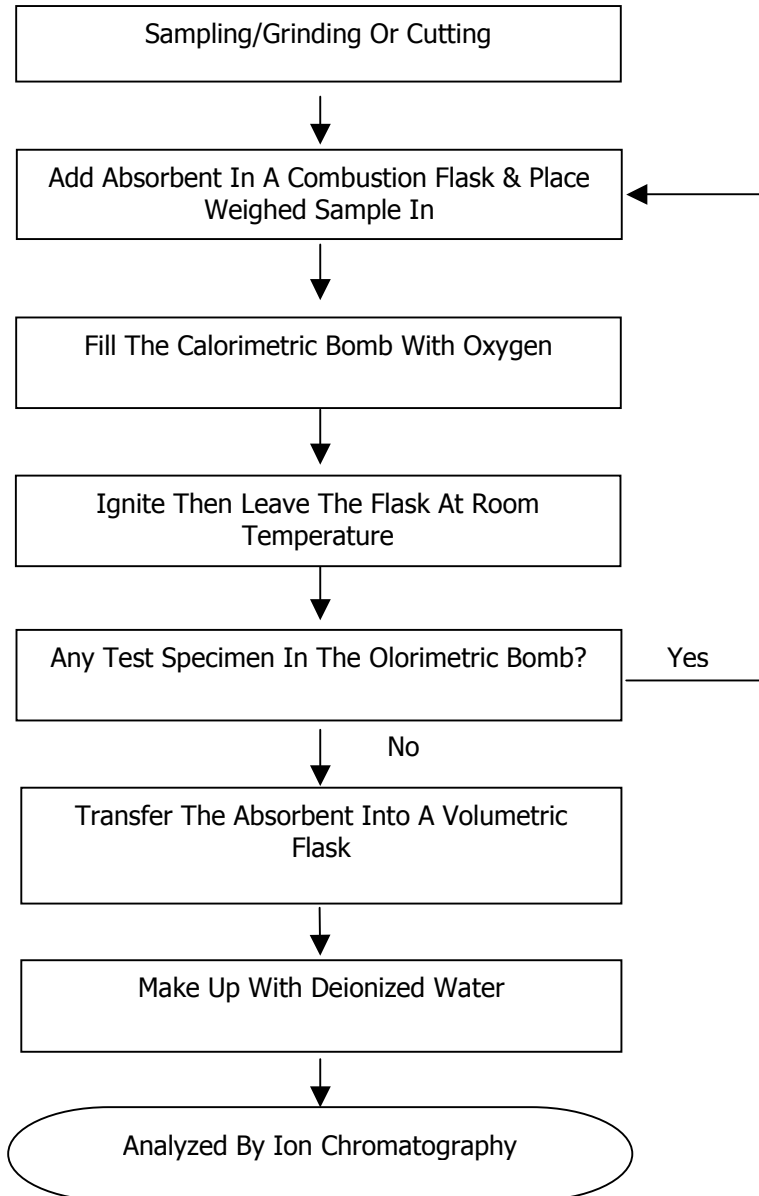
Remarks : Reporting Limit = Quantitation Limit Of Analyte In Sample



Tests Conducted (As Requested By The Applicant)

(III) Measurement Flowchart:

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



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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.

The sample(s) and sample information hereto are provided by the client who shall be solely responsible for the authenticity and integrity thereof. The results shown in this report relate only to the sample(s) received and tested. It is not intended to be a recommendation for any particular course of action. Intertek does not accept a duty of care or any other responsibility to any person other than the Client in respect of this report and only accepts liability to the Client insofar as is expressly contained in the terms and conditions governing Intertek's provision of services to you. Intertek makes no warranties or representations either express or implied with respect to this report save as provided for in those terms and conditions. We have aimed to conduct the review on a diligent and careful basis and we do not accept any liability to you for any loss arising out of or in connection with this report, in contract, tort, by statute or otherwise, except in the event of our gross negligence or wilful misconduct. This report shall not be reproduced unless with prior written approval from Intertek Testing Services Wuxi Ltd.

To : MATERION ADVANCED MATERIALS TECHNOLOGIES
Attention : JENNY YAO

Date : Jan 12, 2022

Re : Report Revision Notification

Labtest Report Number WUXH00123859 date DEC 20, 2021

Please be informed that all the content recorded in the above captioned report will be void. This captioned report is now superseded by a revised Labtest Report, Number WUXH00123859S1 , issued on Jan 12, 2022 .

Thank you for your attention

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



Peter Chen
General Manager

