


Test Report

Client Information :

Applicant : Shandong Beiwu Environmental Protection Technology Co., Ltd.
Address : Room 106, Building 65, Xinmao Qilu Science And Technology City, 299 Zidong Dadao, Tianqiao District, Jinan City, Shandong Province
Sample Name : Ozone Generator
Sample Model : BW-STL, BW-ST5, BW-STA, BW-CZ, BW-AF, BW-AS, BW-OS, BW-OF, BW-TCP
Brand Name :  北屋环保
Date of Receipt : 2020-06-19
Date of Test : 2020-06-30

Test Method : With reference to IEC 62321: 2013

- 1) Section 6: Screening by X-ray Fluorescence Spectrometry (XRF)
- 2) Chemical test:

Test Requested	Result
As specified by client, according to RoHS Directive 2011/65/EU with amendment (EU) 2015/863 to test Lead (Pb), Cadmium (Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs), Phthalates(DBP, BBP, DEHP, DIBP) in the submitted sample(s)	Pass

Tested samples: Screening components of submitted samples.

Test/Witness Engineer :

Tim Chen

Approved & Authorized :

Andy Zhang



Tested Sample/Part Description

No.	Component Description
1	Shell
2	Switch Button
3	Cooling fan
4	Plastic
5	Metal
6	Timer
7	Screw
8	Ceramics
9	Ozone tube
10	Rubber
11	EVA

Test Result of XRF

Tested Item(s)	Result										
	1	2	3	4	5	6	7	8	9	10	11
Lead (Pb)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Cadmium (Cd)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Mercury (Hg)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Chromium (Cr)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Bromine (Br)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL

(1) Test Method

Tested Item(s)	Test Method	Test Method
Lead (Pb) Cadmium (Cd) Mercury (Hg) Total Chromium (Cr) Total Bromine (Br)	IEC 62321-2:2013, IEC 62321-1:2013, IEC 62321-3-1:2013,	XRF

Remark:

- (a) BL = Below Limit, OL = Over Limit, LOD = Limit of Detection, -- = Not Regulated,
 3σ = The reproducibility of analytical instruments
 X: the region where further investigation is necessary,
 *=The screened result was found by XRF and further chemical test was suggested
- (b) There are the results on total Br while test items on restricted substances are PBBs and PBDEs.
 There is the result on total Cr while test item on restricted substances is Cr(VI).
- (c) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP-OES (for Cd, Pb, Hg), UV-Vis (for Cr(VI)) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC62321 (unit: mg/kg).

Element	Polymer materials	Metallic materials	Composite materials
Cadmium (Cd)	$BL \leq (70-3\delta) < X < (130+3\delta) \leq OL$	$BL \leq (70-3\delta) < X < (130+3\delta) \leq OL$	$LOD < X < (150+3\delta) \leq OL$
Lead (Pb)	$BL \leq (700-3\delta) < X < (1300+3\delta) \leq OL$	$BL \leq (700-3\delta) < X < (1300+3\delta) \leq OL$	$BL \leq (500-3\delta) < X < (1500+3\delta) \leq OL$
Mercury (Hg)	$BL \leq (700-3\delta) < X < (1300+3\delta) \leq OL$	$BL \leq (700-3\delta) < X < (1300+3\delta) \leq OL$	$BL \leq (500-3\delta) < X < (1500+3\delta) \leq OL$
Chromium (Cr)	$BL \leq (700-3\delta) < X$	$BL \leq (700-3\delta) < X$	$BL \leq (500-3\delta) < X$
Bromine (Br)	$BL \leq (300-3\delta) < X$	Not Applicable	$BL \leq (250-3\delta) < X$

RoHS Requirement

Restricted substances	Limits
Lead(Pb)	0.1%(1000 ppm)
Cadmium(Cd)	0.01%(100 ppm)
Mercury(Hg)	0.1%(1000 ppm)
Chromium(VI)(Cr6+)	0.1%(1000 ppm)
Polybrominated biphenyls(PBBs)	0.1%(1000 ppm)
Polybrominated diphenyl ethers (PBDEs)	0.1%(1000 ppm)

The above limits were quoted from 2011/65/EU with amendment (EU) 2015/863.

(a)The test result of PBBs, PBDEs

Tested Item	Result(mg/kg)										
	1	2	3	4	5	6	7	8	9	10	11
Monobromobiphenyl (MonoBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Dibromobiphenyl (DiBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tribromobiphenyl (TriBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tetrabromobiphenyl (TetraBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Pentabromobiphenyl (PentaBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Hexabromobiphenyl (HexaBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Heptabromobiphenyl (HeptaBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Octabromobiphenyl (OctaBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Nonabromobiphenyl (NonaBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Decabromobiphenyl (DecaBB)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Sum of polybrominated Biphenyls(PBBs)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Monobromodiphenyl ether (MonoBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Dibromodiphenyl ether (DiBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tribromodiphenyl ether (TriBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tetrabromodiphenyl ether (TetraBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Pentabromodiphenyl ether (PentaBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Hexabromodiphenyl ether (HexaBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Heptabromodiphenyl ether (HeptaBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Octabromodiphenyl ether (OctaBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Nonabromodiphenyl ether (NonaBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Decabromodiphenyl ether (DecaBDE)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Sum of polybrominated diphenyl ethers(PBDEs)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

(b) The test result of DBP, BBP, DEHP, DIBP

Tested Item(s)	Result										
	1	2	3	4	5	6	7	8	9	10	11
Dibutyl phthalate(DBP)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Benzylbutyl phthalate(BBP)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Di-2-ethylhexyl phthalate(DEHP)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Diisobutyl phthalate(DIBP)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

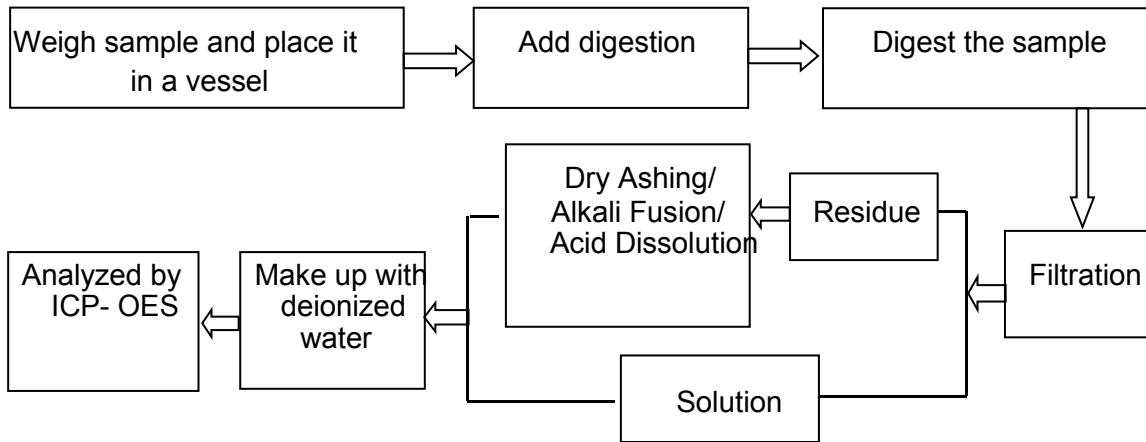
(c) Test Method for Chemical Confirmation

Test Item	Test Method	Test Instrument	MDL (mg/kg)	EU RoHS Limit (mg/kg)
Cadmium (Cd)	IEC 62321-5:2013	ICP-OES	10	100
Lead (Pb)	IEC 62321-5:2013	ICP-OES	10	1000
Mercury (Hg)	IEC 62321-4:2013	ICP-OES	10	1000
Hexavalent Chromium (Cr(VI))	IEC 62321-7-2:2017 (non-metal)	UV-Vis	10	1000
	IEC 62321-7-1:2015 (metal)	UV-Vis	0.1(µg/cm)	1000
Polybrominated Biphenyls (PBBs)	IEC 62321-6:2015	GC-MS	10	1000
Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS	10	1000
Phthalates(DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS	50	1000

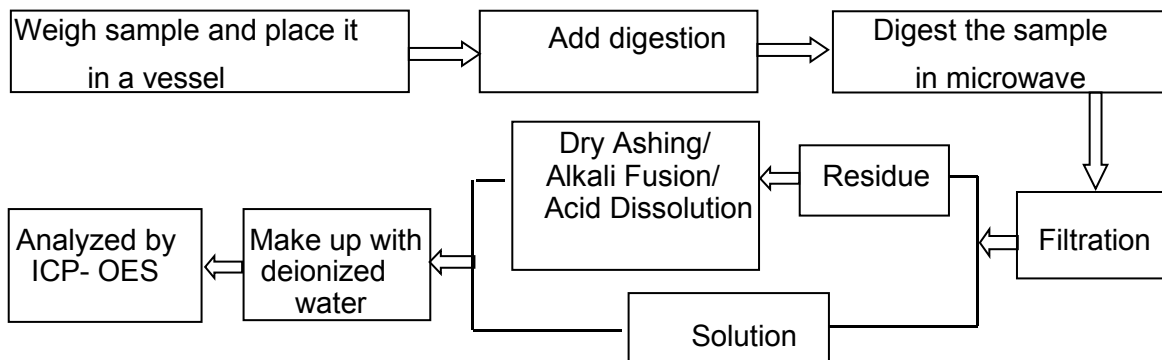
Remark: MDL = Method Detection Limit
 N.D. = Not Detected (<MDL)
 mg/kg = ppm = parts per million
 <1>: According to the declaration from the client, Lead (Pb) in the sample is exempted by EU RoHS Directive 2011/65/EU based on: Copper alloy containing up to 4% lead by weight.

Test Process

1. Lead(Pb), Cadmium(Cd), Chromium(Cr)

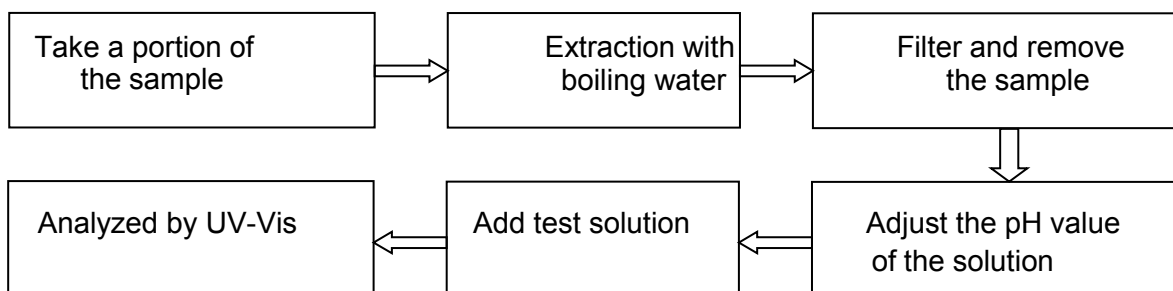


2. Mercury(Hg)



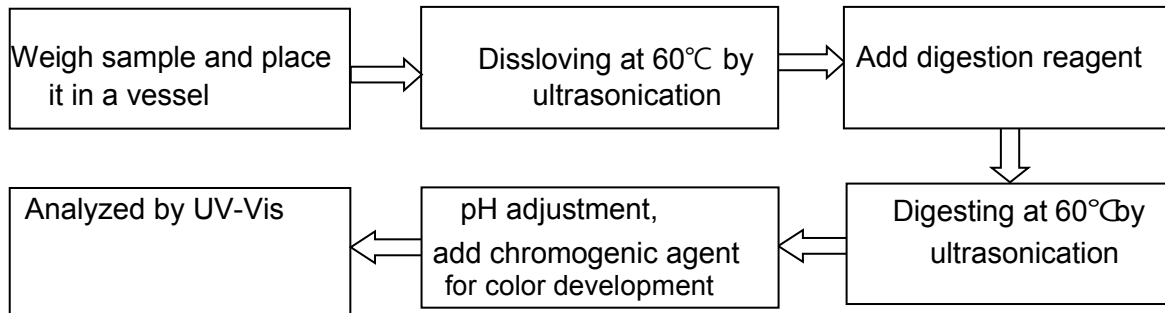
3. Hexavalent Chromium (Cr (VI))

**(1) IEC 62321-7-1:2015
Plating/Metal sample(s)**



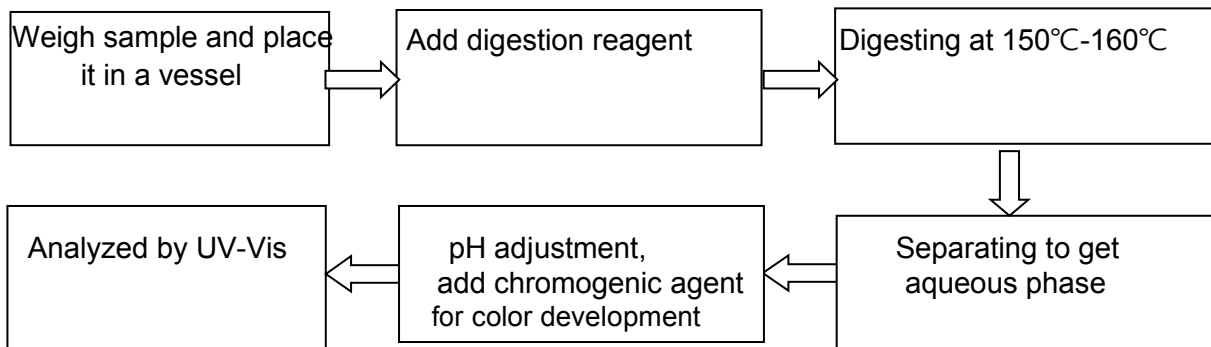
(2) IEC 62321-7-2:2017

Non-metal sample(s) (Material ABS/PC/PVC)

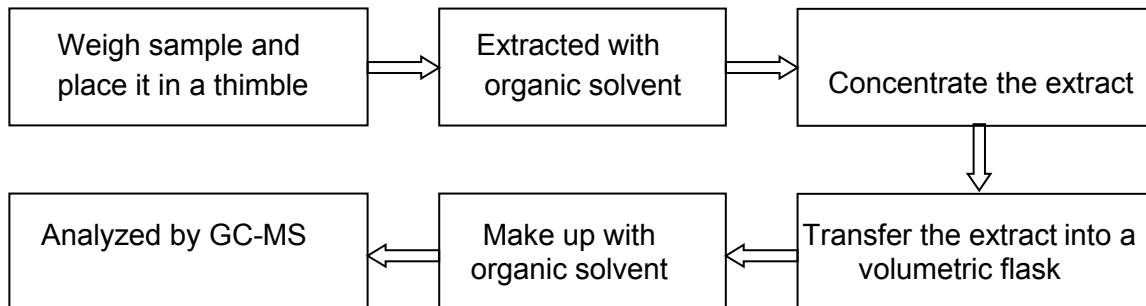


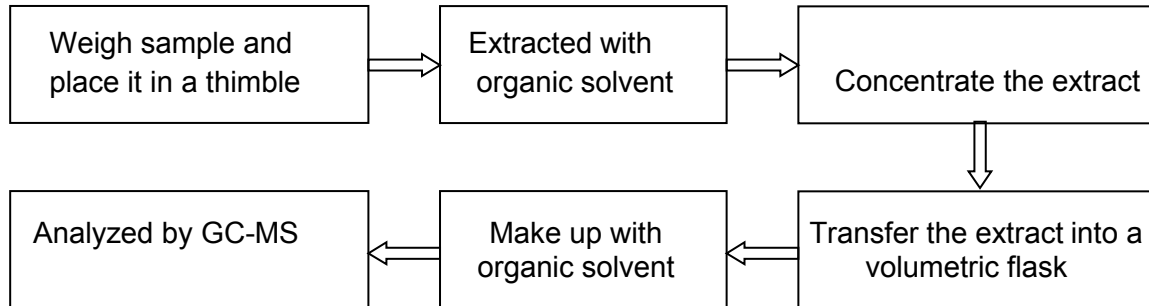
(3) IEC 62321-7-2:2017

Non-metal sample(s) (Others)



4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)



5. Phthalates(DBP/BBP/DEHP/DIBP)**Remark:**

- Chemical confirmation tests were conducted to verify the inconclusive, Chromium (VI) (Cr^{6+}), Polybrominated biphenyls (PBBS) and Polybrominated included in this report.
- As requested by the applicant, only components shown in this report were screened by XFR spectroscopy for 2011/65/EU & (EU) 2015/863, other components were not screened included in this report.

Disclaimers:

- This XRF Screening Report tests were reference purposes only. The applicant shall make its/his/her purposes.
- The results shown in this XRF screening Report will based on various factors. Including but not limited to, the sample size, thickness, area, surface flatness, equipment parameters and matrix effect (e.g. Plastic, Rubber, Metal, Glass, Ceramic etc.). Further wet chemical pre-treatment with relevant chemical equipment analysis are required to obtain quantitative data.
- Photo is included.

Photograph of Sample





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