

TEST REPORT

Report No. AL2105268001EN

Approved date: May. 17, 2021

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Client TONGFU MICROELECTRONICS CO.,LTD.
Address No.288,CHONGCHUAN ROAD,CHONGCHUAN ECONOMIC DEVELOPMENT AREA,NANTONG,JIANGSU,P.R.CHINA.

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

Sample Name QFN Series
Test Part 1.Black body 2. Silvery metal

Date Received May. 11, 2021**Test Period** May. 11, 2021 to May. 17, 2021**Test Request** **Black body:**

1. To determine the Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) in the received sample(s).
2. To determine the Phthalates (9P, DEHP、DBP、BBP、DIBP、DINP、DIDP、DNOP、DNHP、DnPP) in the received sample(s).
3. To determine the Perfluorooctane Sulfonates(PFOS), Perfluorooctanoic Acid(PFOA) in the received sample(s).
4. To determine the Hexabromocyclododecane (HBCDD) in the received sample(s).
5. To determine the Fluorine(F), Chlorine(Cl), Bromine(Br), Iodine(I) in the received sample(s).
6. To determine the Antimony (Sb) in the received sample(s).

Silvery metal:

1. To determine the Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)) in the received sample(s).
2. To determine the Perfluorooctane Sulfonates(PFOS), Perfluorooctanoic Acid(PFOA) in the received sample(s).
3. To determine the antimony (Sb) in the received sample(s).

For more information about the test, please refer to the following pages.Compiled
By

He hai ying

Checked
By

Zhu Zhengfeng

Approved
by

Jiang He

Signed for and on behalf of

Shanghai Lelangtek Testing Technology Co., Ltd.(2nd Floor, Building 4, No.158, Jinfeng Road, Pudong District, Shanghai)

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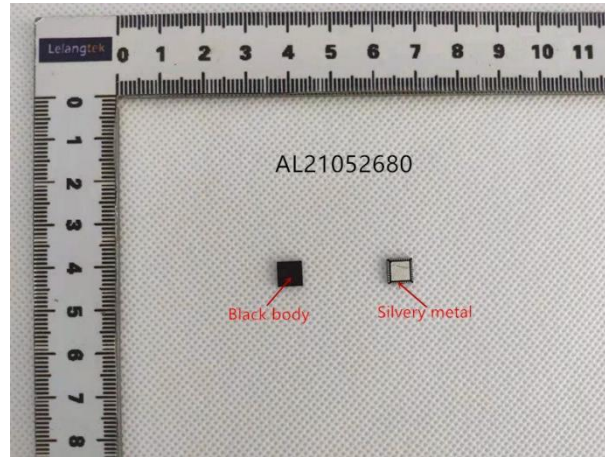
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Sample Photo(s)

Lelangtek authenticated the photo on original report only

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Test Result

No.	Test Item	Result(mg/kg)		MDL (mg/kg)	Limit (mg/kg)
		Black body	Silvery metal		
1	Lead (Pb)	ND	ND	2	≤1000
2	Cadmium (Cd)	ND	ND	2	≤100
3	Mercury (Hg)	ND	ND	2	≤1000
4	Hexavalent Chromium (Cr(VI))	ND	/	8	≤1000
		/	Negative	See note 4	
5. Polybrominated Biphenyls (PBBs)					
5.1	Monobromobiphenyls	ND	/	5	--
5.2	Dibromobiphenyls	ND	/	5	--
5.3	Tribromobiphenyls	ND	/	5	--
5.4	Tetrabromobiphenyls	ND	/	5	--
5.5	Pentabromobiphenyls	ND	/	5	--
5.6	Hexabromobiphenyls	ND	/	5	--
5.7	Heptabromobiphenyls	ND	/	5	--
5.8	Octabromobiphenyls	ND	/	5	--
5.9	Nonabromobiphenyls	ND	/	5	--
5.10	Decabromobiphenyls	ND	/	5	--
5.11	Polybrominated Biphenyls (PBBs) total	ND	/	--	≤1000
6. Polybrominated Diphenyl Ethers (PBDEs)					
6.1	Monobromodiphenyl ethers	ND	/	5	--
6.2	Dibromodiphenyl ethers	ND	/	5	--
6.3	Tribromodiphenyl ethers	ND	/	5	--
6.4	Tetrabromodiphenyl ethers	ND	/	5	--
6.5	Pentabromodiphenyl ethers	ND	/	5	--
6.6	Hexabromodiphenyl ethers	ND	/	5	--
6.7	Heptabromodiphenyl ethers	ND	/	5	--
6.8	Octabromodiphenyl ethers	ND	/	5	--
6.9	Nonabromodiphenyl ethers	ND	/	5	--
6.10	Decabromodiphenyl ethers	ND	/	5	--
6.11	Polybrominated Diphenyl ethers (PBDEs) total	ND	/	--	≤1000

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No.	Test Item	Result(mg/kg)		MDL (mg/kg)	Limit (mg/kg)
		Black body	Silvery metal		
7.Phthalates(PAEs)					
7.1	Di(2-ethylhexyl) phthalate (DEHP)	ND	/	50	1000
7.2	Dibutyl phthalate(DBP)	ND	/	50	1000
7.3	Butyl benzyl phthalate (BBP)	ND	/	50	1000
7.4	Di-isobutyl Phthalate(DIBP)	ND	/	50	1000
7.5	Di-isononyl phthalate(DINP)	ND	/	50	1000
7.6	Di-iso-decyl phthalate(DIDP)	ND	/	50	1000
7.7	Di-n-octyl phthalate(DNOP)	ND	/	50	1000
7.8	Di-n-hexyl phthalate (DNHP)	ND	/	50	1000
7.9	Di-n-pentyl phthalate-d4(DnPP)	ND	/	50	1000
8.Perfluorooctane sulphonate (PFOS)					
8.1	Perfluorooctane sulphonate (PFOS)	ND	ND	0.01	--
9.Perfluorooctanoic Acid(PFOA)					
9.1	Perfluorooctanoic Acid(PFOA)	ND	ND	0.01	--
10.Hexabromocyclododecane (HBCDD)					
10.1	Hexabromocyclododecane (HBCDD)	ND	/	10	--
11.Antimony (Sb)					
11.1	Antimony (Sb)	ND	ND	10	--
12.Halogen					
12.1	Fluorine(F)	ND	/	50	--
12.2	Chlorine(Cl)	ND	/	50	--
12.3	Bromine(Br)	ND	/	50	--
12.4	Iodine(I)	ND	/	50	--

Note:

- (1) The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.
- (2) ND=Not detected (Below the detection limit);
- (3) mg/kg = ppm=parts per million.
- (4) When Cr(VI) in a sample is detected below the $0.10\mu\text{g}/\text{cm}^2$, the sample is negative for Cr(VI).
When Cr(VI) is detected above $0.13\mu\text{g}/\text{cm}^2$, the sample is positive for the presence of Cr(VI) in the

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coating layer. A "grey zone" between $0.10\mu\text{g}/\text{cm}^2$ and $0.13\mu\text{g}/\text{cm}^2$ has been established as "inconclusive" to reduce inconsistent results due to unavoidable coating variations. In this case, additional testing may be necessary to confirm the presence of Cr(VI).

Test Method

Test Item	Test Method	Measured Equipment
Lead (Pb), Cadmium (Cd)	IEC 62321-3-1:2013 & IEC 62321-5:2013	XRF&ICP-OES
Mercury (Hg)	IEC 62321-3-1:2013 & IEC 62321-4:2018	XRF&ICP-OES
Hexavalent Chromium (Cr(VI))	IEC 62321-7-1:2015	UV-Vis
	IEC 62321-7-2:2017	UV-Vis
Polybrominated biphenyls (PBBs)	IEC 62321-6:2015	GC-MS
Polybrominated diphenyl ethers (PBDEs)		GC-MS
Phthalates	IEC 62321-8: 2017	GC-MS
Perfluorooctane Sulfonates(PFOS)	CEN/TS 15968:2010	LC-MS-MS
Perfluorooctanoic Acid(PFOA)		
Hexabromocyclododecane (HBCDD)	US EPA 3550C:1996 & US EPA 270D:2014	GC-MS
Antimony (Sb)	US EPA 3050B:1996 & US EPA 6010C:2007	ICP-OES
	US EPA 3052:1996 & US EPA 6010C:2007	ICP-OES
Fluorine(F), Chlorine(Cl), Bromine(Br),Iodine(I)	EN 14582:2016	IC

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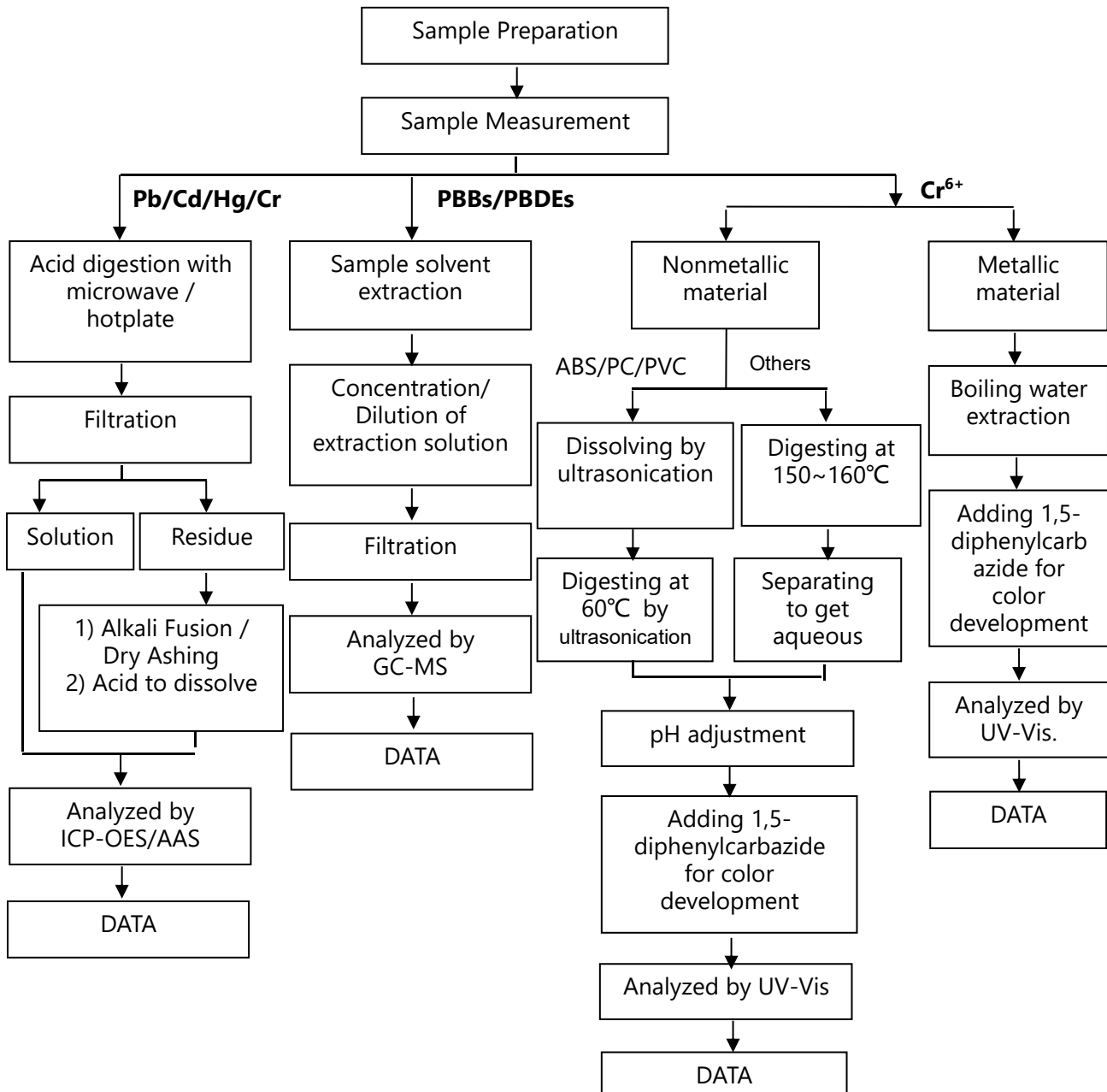
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Test Flow Chart

Lead(Pb)/Cadmium(Cd)/Mercury(Hg)/Hexavalent Chromium (Cr(VI))/Polybrominated Biphenyls (PBBs)/Polybrominated Diphenyl Ethers (PBDEs)



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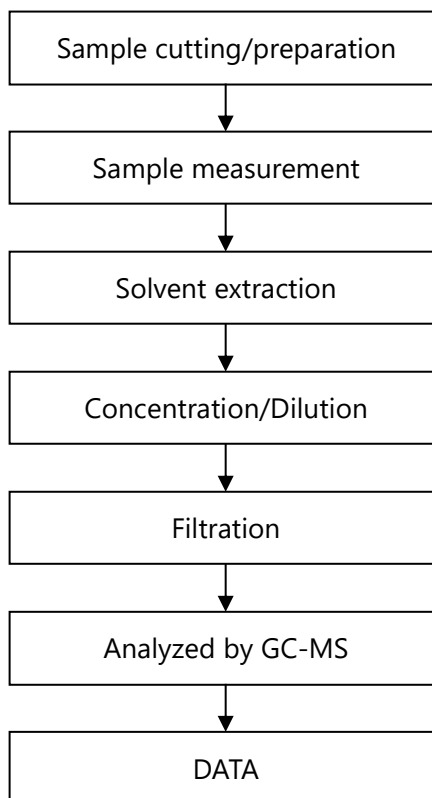
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Phthalates (PAEs)



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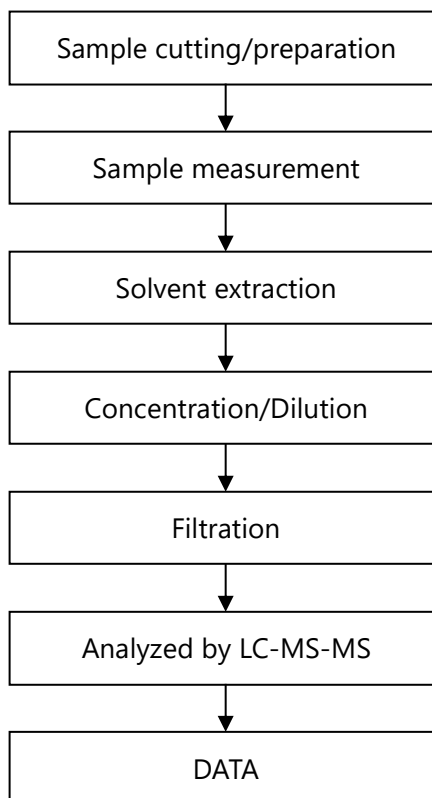
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Perfluorooctane Sulfonates(PFOS)/Perfluorooctanoic Acid(PFOA)

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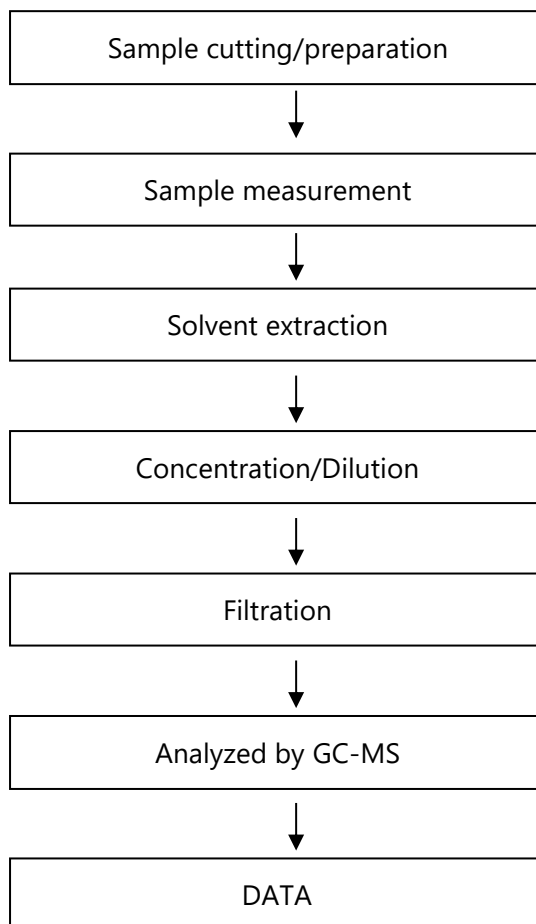
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Hexabromocyclododecane (HBCDD)

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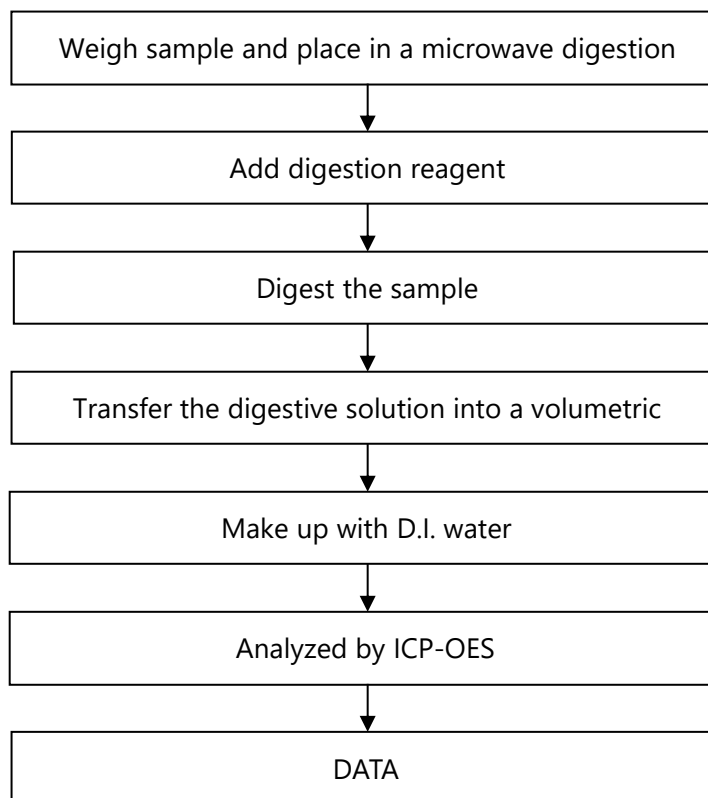
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Antimony (Sb)



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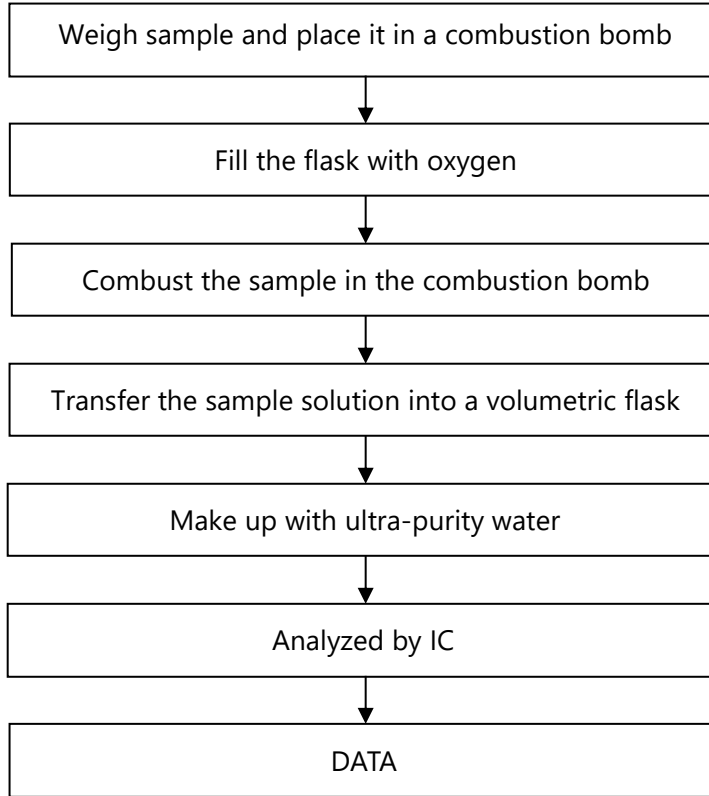
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Fluorine(F)/Chlorine(Cl)/Bromine(Br)/Iodine(I)



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