TEST REPORT

Report No: AR-22-SV-053806-01
Customer: ROKKO LEADFRAMES PTE. LTD.
Date of Issue: 29/12/2022
JB Ref: 156-2022-12000897

Batch No: EUMYBM-00127968
Sample No: 138-2022-12006941

To: **ROKKO LEADFRAMES PTE. LTD.**
27, Tuas Ave 2
639458 .
SINGAPORE

Attn: Ms. Anu. K. Gopalan

Date Sample Received: 22/12/2022
Date of Testing: 23/12/2022 to 29/12/2022

The following sample was identified by the customer as :
Ag PLATED LEADFRAMES (BM C7025)

Client Sample Code: 156-2022-12000897

Objective (s):
1. Determination of Cadmium (Cd), Hexavalent Chromium (Cr6+), Lead (Pb), Mercury (Hg), Phthalate, Polybrominated Biphenyl (PBBs), Polybrominated Diphenyl Ether (PBDEs) with RoHS Directive 2011/65/EU and (EU)2015/863 (amendment in Annex II).
2. Determination of Phthalate, Hexabromocyclododecane (HBCDD), Antimony (Sb) , Beryllium (Be) and Tin (Sn) for above sample.
3. Determination of Bromine (Br), Fluorine (F), Iodine (I), Screening of PFOA (as F), Screening of PFOS (as F), Screening of SCCP, PCBs, PCN & PCT (as Cl) for above sample.

Conclusion :

Test(s) Required	Compliance with Objective(s)
Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (Cr6+), Monobromobiphenyl, Dibromobiphenyls, Tribromo biphenyls, Tetrabromo biphenyls, Pentabromo biphenyls, Hexabromo biphenyls,Heptabromobiphenyl, Octabromo biphenyls, Nonabromo biphenyls, Decabromo biphenyls, SumPolybrominated Biphenyles (PBB), Monobromodiphenyl ether, Dibromodiphenylether, Tribromo diphenylethers, Tetrabromo diphenyl ethers, Pentabromodiphenyl ether, Hexabromo diphenyl ethers, Heptabromodiphenyl ethers, Octabromo diphenyl ethers, Nonabromo diphenyl ethers, Decabromo diphenyl ethers, SumPolybrominated Diphenyl Ether (PBDE), Benzyl butyl phthalate (BBP), Bis(2-ethylhexyl)phthalate (DEHP),Dibutyl phthalate (DBP), Di-isobutyl phthalate (DiBP)	Comply
Dihexyl phthalate (DHXP), Diisodecyl phthalate (DIDP), Diisononyl phthalate (DINP), Di-n-octylphthalate (DNOP), Bis(2-methoxyethyl) phthalate (DMEP), DiisoHeptylphthalate (DiHP), Hexabromocyclododecane (HBCDD), Antimony (Sb), Beryllium (Be), Tin (Sn)	-
Bromine (Br), Fluorine (F), Iodine (I), Screening of PFOA (as F), Screening of PFOS (as F), Sreening of SCCP, PCBs, PCN & PCT (as Cl)	-

Test Result(s):

Analysis	Industrial Products Analysis	Unit	Result	LOQ	Test Method	Specification
SVK51	Cadmium (Cd)	mg/kg	<LOQ	1	IEC 62321-5	≤100mg/kg
SVL03	Lead (Pb)	mg/kg	22	10	IEC 62321-5	≤1000mg/kg
SVK82	Mercury (Hg)	mg/kg	<LOQ	5	IEC 62321-4	≤1000mg/kg
SVK66	Hexavalent Chromium (Cr6+)	-	negative	-	IEC 62321-7-1	≤1000mg/kg (Refer Note 2)
SVK16	**Polybrominated Biphenyl (PBBs)**				IEC 62321-6	
	Monobromo biphenyl	mg/kg	<LOQ	20		Refer Note 3
	Dibromo biphenyl	mg/kg	<LOQ	20		Refer Note 3
	Tribromo biphenyl	mg/kg	<LOQ	20		Refer Note 3
	Tetrabromo biphenyl	mg/kg	<LOQ	20		Refer Note 3
	Pentabromo biphenyl	mg/kg	<LOQ	20		Refer Note 3

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Analysis		Industrial Products Analysis	Unit	Result	LOQ	Test Method	Specification
		Hexabromo biphenyl	mg/kg	<LOQ	20		Refer Note 3
		Heptabromo biphenyl	mg/kg	<LOQ	20		Refer Note 3
		Octabromo biphenyl	mg/kg	<LOQ	20		Refer Note 3
		Nonabromo biphenyl	mg/kg	<LOQ	20		Refer Note 3
		Decabromo biphenyl	mg/kg	<LOQ	20		Refer Note 3
		Sum Polybrominated Biphenyls (PBBs)	mg/kg	<LOQ	20		≤1000mg/kg
SVK17		**Polybrominated Diphenyl Ether (PBDEs)**				IEC 62321-6	
		Monobromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Dibromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Tribromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Tetrabromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Pentabromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Hexabromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Heptabromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Octabromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Nonabromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Decabromo diphenyl ether	mg/kg	<LOQ	20		Refer Note 3
		Sum Polybrominated Diphenyl Ethers (PBDEs)	mg/kg	<LOQ	20		≤1000mg/kg
SVT99		**Phthalate (DEHP, BBP, DBP & DIBP)**				In-House Method based on USEPA 3540C, GC-MS SOP-TM.ORG.012	
		Benzyl butyl phthalate (BBP)	% (w/w)	<LOQ	0.01		≤0.1%
		Bis(2-ethylhexyl)phthalate (DEHP)	% (w/w)	<LOQ	0.01		≤0.1%
		Dibutyl phthalate (DBP)	% (w/w)	<LOQ	0.01		≤0.1%
		Di-isobutyl phthalate (DiBP)	% (w/w)	<LOQ	0.01		≤0.1%
SVK12		**Phthalate**				In-House Method based on USEPA 3540C, GC-MS EUBM.SOP.TM.IP.26	
		Di-n-octylphthalate (DNOP)	% (w/w)	<LOQ	0.01		-
		Diisononyl phthalate (DINP)	% (w/w)	<LOQ	0.02		-
		Diisodecyl phthalate (DIDP)	% (w/w)	<LOQ	0.02		-
		Dihexyl phthalate (DHXP)	% (w/w)	<LOQ	0.01		-
SV03B	◆	DiisoHeptylphthalate (DiHP)	% (w/w)	<LOQ	0.01	In-House Method based on USEPA 3540C, GC-MS	-
SV03F	◆	Bis(2-methoxyethyl) phthalate (DMEP)	% (w/w)	<LOQ	0.01	In-House Method based on USEPA 3540C, GC-MS	-
SVM48	◆	Hexabromocyclododecane (HBCDD)	mg/kg	<LOQ	5	In-house Method, GC-MS	-
SVL43		Bromine (Br)	mg/kg	<LOQ	50	BS EN 14582 (Calorimetric Bomb/Ion Chromatography)	-

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SVL53	Fluorine (F)	mg/kg	<LOQ	50	BS EN 14582 (Calorimetric Bomb/Ion Chromatography)	-
SVL51	Iodine (I)	mg/kg	<LOQ	50	BS EN 14582 (Calorimetric Bomb/Ion Chromatography)	-
SVL44	Screening of SCCP, PCBs, PCN & PCT (as Cl)	mg/kg	<LOQ	50	BS EN 14582 (Calorimetric Bomb/Ion Chromatography)	-
SVL57	Screening of PFOS (as F)	mg/kg	<LOQ	50	BS EN 14582 (Calorimetric Bomb/Ion Chromatography)	-
SVL56	Screening of PFOA (as F)	mg/kg	<LOQ	50	BS EN 14582 (Calorimetric Bomb/Ion Chromatography)	-
SVK18	Antimony (Sb)	mg/kg	<LOQ	10	US EPA 6010C	-
SVL25	Tin (Sn)	mg/kg	124	5	US EPA 6010C	-
SVK41	Beryllium (Be)	mg/kg	<LOQ	5	US EPA 6010C	-
SVK03	Microwave Assisted Acid Digestion	-	Done	-	US EPA 3052	-

Specification Note
1. RoHS Directive 2011/65/EU and (EU) 2015/863 (amendment in Annex II)
2. Expression result for Hexavalent Chromium
i. Concentration of Hexavalent chromium (<0.10µg/cm2) = Negative (sample coating is consider non Cr(VI) based coating)
ii. Concentration of Hexavalent chromium (≥0.10 and ≤0.13 µg/cm2) = Inconclusive (Unavoidable coating variations may influence the determination)
iii.Concentration of Hexavalent chromium (≥0.13µg/cm2) = Positive (Sample coating is consider to contain Cr(VI))
3. Based on sum amount of PBB/PBDE limit, which is ≤1000mg/kg

Remark
1. The test portion was totally dissolved for cadmium, lead & mercury test by using pre-conditioning method as mentioned above.
2. IEC 62321 flowchart can be obtained from https://cdnmedia.eurofins.com/apac/media/606192/efctm001-issue-2.pdf
3. USEPA 3540C/GC-MS Flowchart can be obtained https://cdnmedia.eurofins.com/apac/media/601323/efctm005issue01.pdf
4. BS EN 14582:2007 flowchart can be obtained from https://cdnmedia.eurofins.com/apac/media/601321/efctm003issue01.pdf

This 4 page(s) of report and its attachment(s), if relevant, has/have been validated by

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EXPLANATORY NOTE

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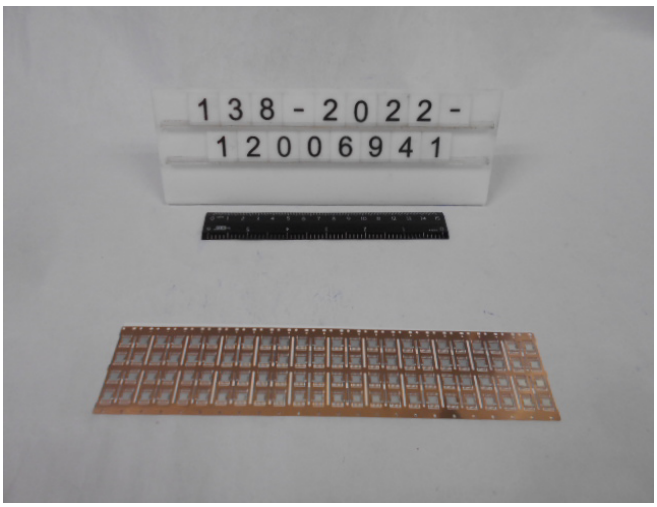
N/A means not applicable.
<LOD means not detected at or below the Limit of Detection (LOD).
<LOQ means below the Limit of Quantification (LOQ)

Sample Photograph



- End of Report -

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