Testing Report

Report No.: SEP/GZ/X/E2305[redacted]
Instead of SEP/GZ/X/E230[redacted]

Revision Date: Jun 13,2023
Date: Jun 01,2023

Testing Summary of Tested Component on Submitted Sample:

Testing items	Conclusion
RoHS Directive 2011/65/EU and amendment Commission Delegated Directive (EU) 2015/863--Restriction of the use of certain hazardous substance in electrical and electronic equi pm ent.	Pass

Signed and Authorized by:

GUANGDONG SEP ANALYTICAL SERVICES CO.,LTD. 广东标检检测服务有限公司 检验检测专用章

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RoHS Directive 2011/65/EU and amendment Commission Delegated Directive (EU) 2015/863--Restriction of the use of certain hazardous substance in electrical and electronic equipment

(A) Screening Test by XRF Spectroscopy

Cadmium (Cd), Lead (Pb), Mercury (Hg), Chromium (Cr) and Bromine (Br) content were measured with reference to IEC 62321-3-1 Edition 1.0:2013 by XRF spectroscopy and chemical confirmation test for RoHS restricted substances.

Screened Components	XRF Results		Chemical Confirmation Result
1a	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1b	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1c	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1d	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1e	Cd	ND	Cr^{6+}:Negative(<0.10μg/cm^2)
	Pb	ND	
	Hg	ND	
	Cr	Inconclusive	
	Br	NA	

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1f	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1g	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1h	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1i	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1j	Cd	ND	Cr^{6+}:Negative(<0.10μg/cm^2)
	Pb	ND	
	Hg	ND	
	Cr	Inconclusive	
	Br	NA	
1k	Cd	ND	Cr^{6+}:Negative(<0.10μg/cm^2)
	Pb	ND	
	Hg	ND	
	Cr	Inconclusive	
	Br	NA	

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Screened Components	XRF Results		Chemical Confirmation Result
1l	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1m	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1n	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1o	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
1p	Cd	ND	Cr^{6+}:Negative(<0.10μg/cm^2)
	Pb	ND	
	Hg	ND	
	Cr	Inconclusive	
	Br	NA	
1q	Cd	ND	Cr^{6+}:Negative(<0.10μg/cm^2)
	Pb	ND	
	Hg	ND	
	Cr	Inconclusive	
	Br	NA	

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Screened Components	XRF Results		Chemical Confirmation Result
1r	Cd	ND	Cr^{6+}:N D(<8m g/kg)
	Pb	ND	
	Hg	ND	
	Cr	Inconclusive	
	Br	ND	
2a	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
2b	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
2c	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
2d	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
3a	Cd	ND	Cr^{6+}:Negative(<0.10μg/cm^2)
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	Inconclusive	
		NA	

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Screened Components	XRF Results		Chemical Confirmation Result
3b	Cd	ND	Cr^{6+}:Negative(<0.10μg/cm^2)
	Pb	ND	
	Hg	ND	
	Cr	Inconclusive	
	Br	NA	
3c	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
3d	Cd	ND	Cr^{6+}:Negative(<0.10μg/cm^2)
	Pb	ND	
	Hg	ND	
	Cr	Inconclusive	
	Br	NA	
3e	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
4	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
5a	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	

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Screened Components	XRF Results		Chemical Confirmation Result
5b	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
5c	Cd	ND	NT
	Pb	ND	
	Hg	ND	
	Cr	ND	
	Br	ND	
5d	Cd		NT
	Pb		
	Hg		
	Cr		
	Br		

ND = Not detected
NA = Not applicable
NT = Not tested

Positive = A positive test result indicated the concentration of Cr(VI) is greater than threshold of 0.13μg/cm^2 for boiling-water-extraction procedures by visual comparison / by UV-VIS Spectrophotometer analysis. The sample coating is considered to contain Cr(VI).

Negative = A negative test result indicated the concentration of Cr(VI) is less than threshold of 0.10μg/cm^2 for boiling-water-extraction procedures by UV-VIS Spectrophotometer analysis. The coating is considered a non-Cr(VI) based coating.

(B) Phthalate Content Test

Non-to ys :

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Testitem(s)	MDL (mg/kg)	Lim it (mg/kg)	Result(s)(mg/kg) θ
			1a, 1b, 1c, 1d, 1f, 1g, 1h, 1i, 1l, 1m, 1n, 1o, 1r, 2a, 2c, 2d, 3c, 3e, 4, 5a, 5b, 5c, 5d
Benzyl butyl phthalate (BBP)	50	1000	ND
Dibutyl phthalate (DBP)	50	1000	ND
Bis (2-ethylhexyl) phthalate (DEHP)	50	1000	ND
Di-(iso-butyl) phthalate (DIBP)	50	1000	ND

ND= Not Detected (<MDL)
MDL= Method Detection Limit
θ = Single result for each test component

(C) XRF Screening Limits in mg/kg for Regulated Elements in Various Matrices

Element	Polymer Materials	Metallic Materials	Composite Materials
Cd	P≤70<X<130≤F	P≤70<X<130≤F	P≤70<X<150≤F
Pb	P≤700<X<1300≤F	P≤700<X<1300≤F	P≤500<X<1500≤F
Hg	P≤700<X<1300≤F P ≤	P≤700<X<1300≤F	P≤500<X<1500≤F
Cr	700< X P ≤ 300< X	P≤700<X Not applicable	P≤500<X P≤250<X
Br			

P = Pass
X = Inconclusive result
F = Fail
mg/kg = milligram per kilogram = ppm

(D) Estimated Detection Limits in mg/kg for Regulated Elements in Various Matrices

Element	Polymer Materials	Metallic Materials	Composite Materials
Cd	50	70	70
Pb	100	200	200
Hg	100	200	200

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Cr	100	200	200
Br	200	Not applicable	200

Disclaimers:

This XRF Screening and Chemical Confirmation Test Report is for reference purposes only. The applicant shall make its/his/her own judgment as to whether the information provided in this XRF Screening and Chemical Confirmation Test Report is sufficient for its/his/her purposes.

The results shown in this XRF Screening and Chemical Confirmation Test Report will differ 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 is required to obtain quantitative data.

(E) Chemical Confirmation Test Methods:

Testing Item	Testing Method	Detection Limit
Chromium(VI)(Cr^{6+})Content	With reference to IEC 62321-7-1:2015, by boiling water extraction and determined by UV-VIS Spectrophotometer	0.10μg/cm^2
Chromium(VI)(Cr^{6+})Content	With reference to IEC 62321-7-2:2017, Hexavalent chromium –Determinationofhexavalentchromium(Cr(VI)inpolymers and electronics by the colorimetric method	8mg/kg
Dibutyl phthalate (DBP) & Di-(2-ethyl hexyl)phthalate(DEHP)&Benzyl butyl phthalate (BBP) & Di-(iso-butyl) phthalate (DIBP)	WithreferencetoIEC62321-8Edition1.0:2017,byGas Chromatographic-Mass Spectrometric (GC-MS) analysis	50 mg/kg

(F) RoHS Requirement:

Restricted Substances	Limits

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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)
Dibutyl phthalate (DBP)	0.1% (1000 mg/kg)
Di-(2-ethyl hexyl) phthalate (DEHP)	0.1% (1000 mg/kg)
Benzyl butyl phthalate (BBP)	0.1% (1000 mg/kg)
Di-(iso-butyl) phthalate (DIBP)	0.1% (1000 mg/kg)

The above limits were quoted from Directive 2011/65/EU and amendment Commission Delegated Directive (EU) 2015/863 for homogeneous material.

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Tested Component Description (Location):

1 (a)transparentplastic
(b) black plastic
(c) transparent plastic
(d) black soft plastic (Sealing ring)
(e) Silver color metal mesh
(f) semitransparent soft plastic
(g) black plastic ring
(h) white plastic
(i) white plastic
(j) silver color metal spring (small)
(k) silver color metal spring (big)
(l) white plastic with black coating
(m) white plastic with black coating (shell)
(n) black soft plastic
(o) black plastic
(p) silver color metal ball
(q)silvercolormetal (screw)
(r) white plastic with vacuum plating

2 (a)whitefibre
(b) black material
(c) white gypsum tube
(d) white plastic

3 (a)silvercolormetal(screw)
(b) silver color metal
(c) white plastic

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(d) silver color metal (fastener)

(e) white soft plastic

4 whiteplastic

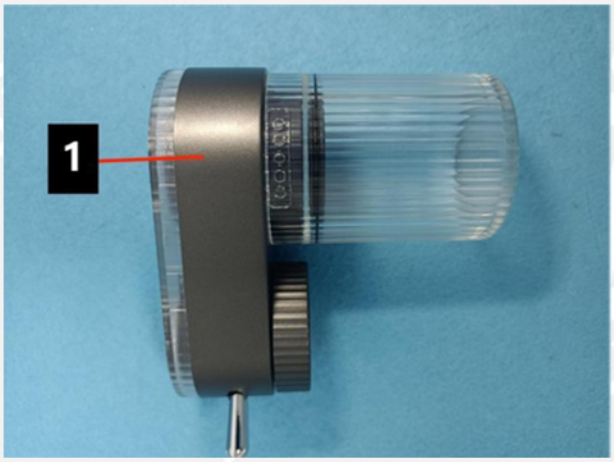
5 (a)whiteplastic

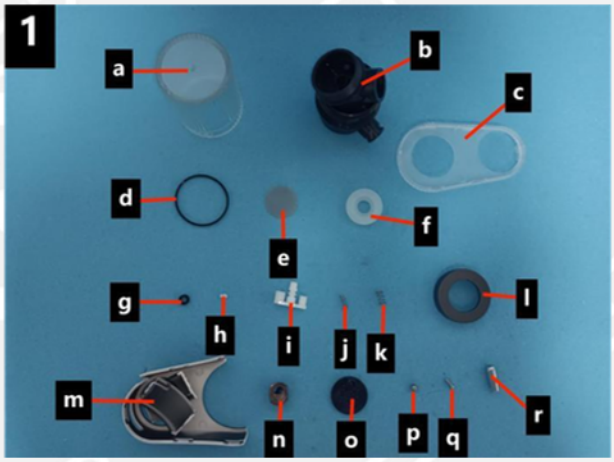
(b) light green plastic

(c) grey plastic

(d) dark grey plastic

Additional Photos for ROHS





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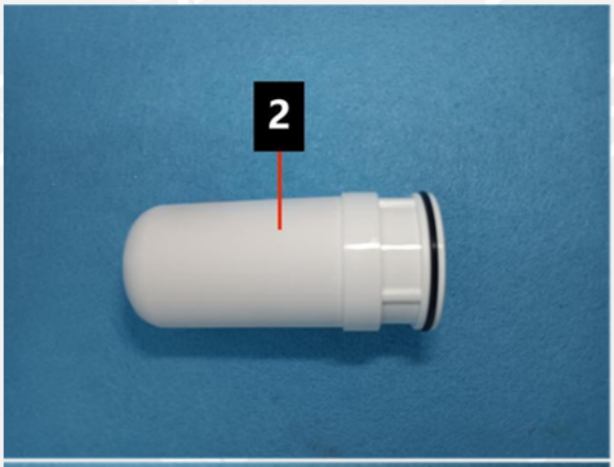

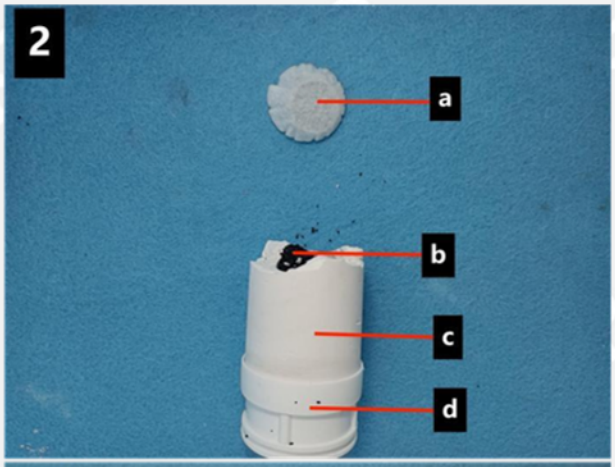

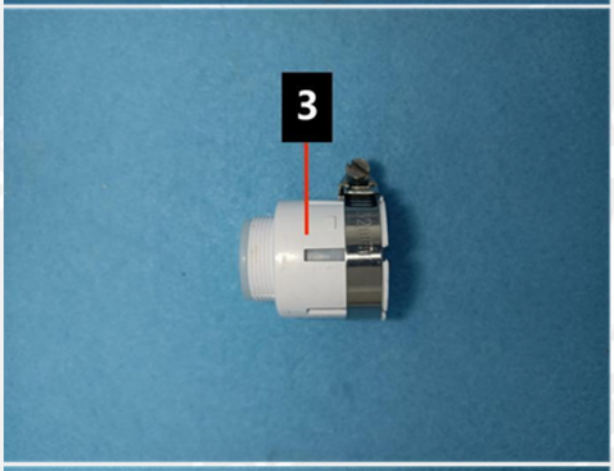

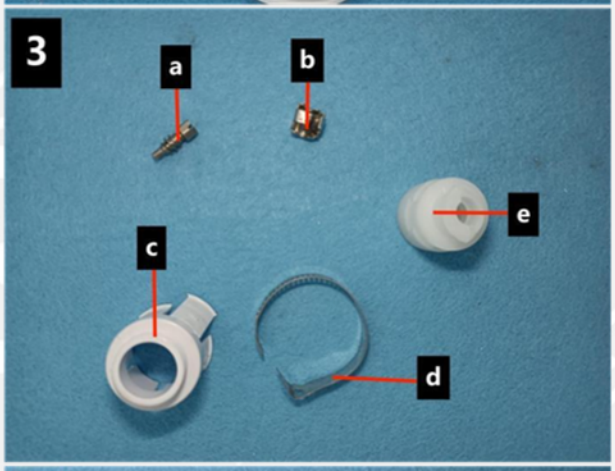

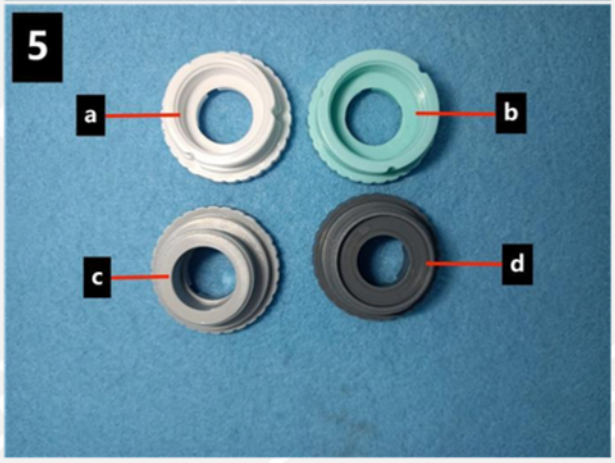

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