

Test Report No.: 48.400.23.1087.01-00/01

Rev.: 00

Dated: 2023-10-30



Applicant: Jiangsu Acrel Electrical Manufacturing. Co., Ltd.
Address: No. 5, Dongmeng Road, Nanzha Street, Jiangyin, Jiangsu, P. R. China
Attn: Han Zhonghua
Sample Description: Hall Transducer
Model No.: AHKC-EKA
Sample Received Date: 2023-10-12
Test Period: 2023-10-12~2023-10-27
Test Location: TÜV SÜD Certification and Testing (China) Co., Ltd.
Shanghai Branch, SHA Chemical Lab.
Purpose of examination: Verification of RoHS (Restriction of Hazardous Substances) directive 2011/65/EU and its amendment (EU) 2015/863 on submitted samples
Test Results: Refer to following page(s)
Remark:
- The result relates only to the items tested.
- The reference model(s) was declared by client.
- The test sample(s) and item(s) was specified by client.

TÜV SÜD Certification and Testing (China) Co., Ltd.
TÜV SÜD Group
Prepared by:



Mr. Yiwei CHEN

Reviewed by:



Mr. Feng ZHANG

Disclaimer Measurement Uncertainty: Unless otherwise agreed upon, Pass or Fail verdicts are given base on the measured values without any considerations of measurement uncertainties. Please note, every test method has a measurement uncertainty which has been evaluated by the laboratory according to ISO/IEC 17025 requirements. By taking measurement uncertainties into account it might happen that measured values can neither be assessed as Pass nor as Fail. Any use for advertising purposes must be granted in writing. This test report may only be quoted in full. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production. For further details, please see testing and certification regulation, chapter A-3.4.

TÜV SÜD Certification and Testing (China) Co., Ltd.
Floor 1-4, Building B, No.37, Tuanjie Road(Middle), Xishan
Economic and Technological Development Zone, Wuxi
Jiangsu. China

Tel.: +86-510-88203737 Fax: +86-510-88203636

www.tuv-sud.cn info@tuv-sud.cn

Shanghai Chemical Lab No. 1999 Du Hui Road
Tel.: +86-21-6037-6501

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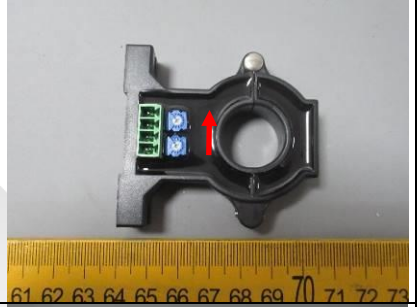
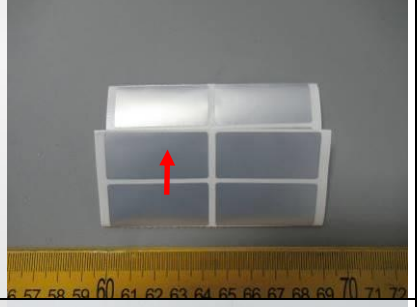
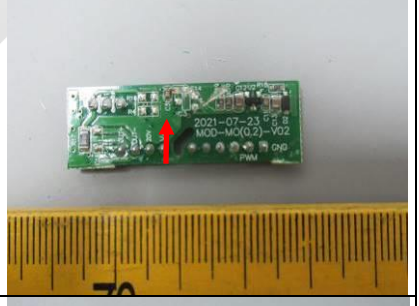
SUMMARY OF TEST RESULTS

No.	Test Requested	Conclusion	Remarks
1.	Heavy Metal (Pb, Cd, Hg and Cr VI) Content	PASS	
2.	Polybrominated Biphenyls (PBBs) and Polybrominated Diphenyl Ethers (PBDEs) Content	PASS	
3.	Phthalates (DEHP, BBP, DBP and DIBP) Content	PASS	



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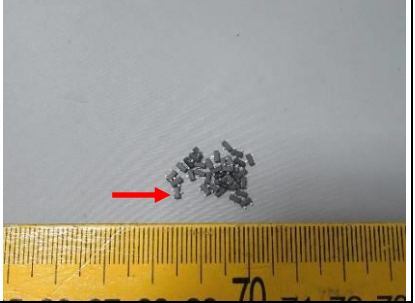
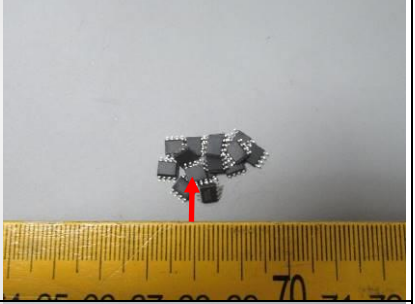
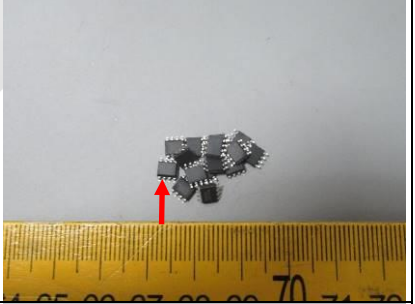
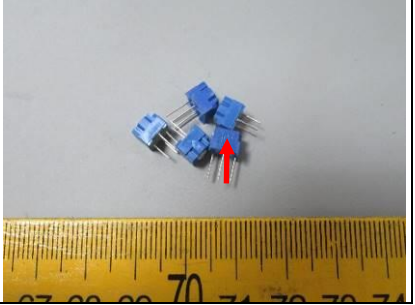
1. TESTED SUBJECT DESCRIPTION

Sample No.	Description (Material, colour)	Photograph/Location
01	Black hard plastic shell	
02	Black potting compound	
03	Silvery soft plastic label	
04	Green hard PCB	
05	Black metal magnet	

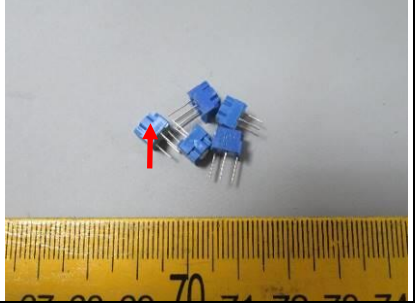
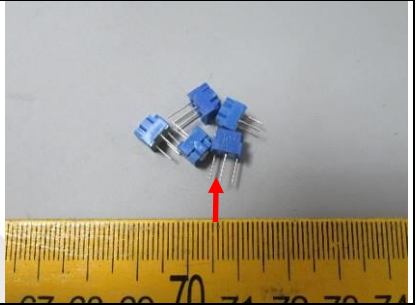
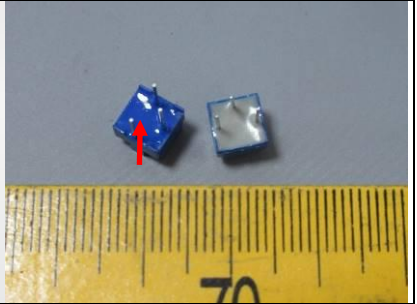
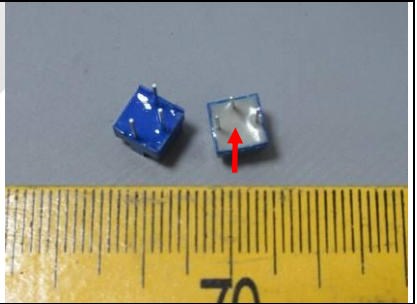


Sample No.	Description (Material, colour)	Photograph/Location
06	Silvery metal nail	
07	Black resistance	
08	Brown capacitor	
09	Black diode	
10	Black triode	

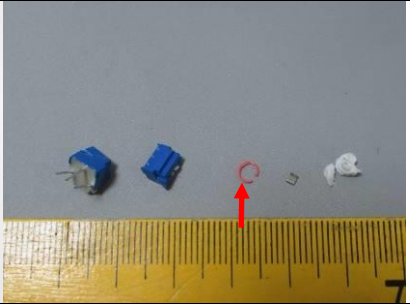
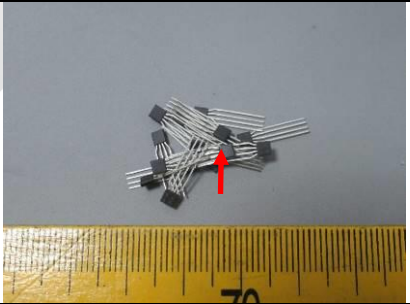
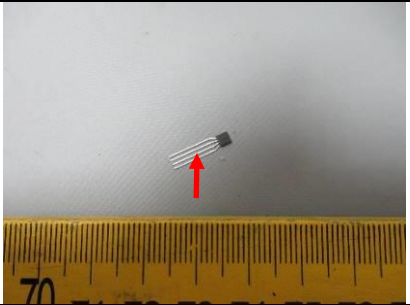


Sample No.	Description (Material, colour)	Photograph/Location
11	Silvery metal pin	
12	Black triode	
13	Black hard IC	
14	Silvery metal pin	
15	Dark blue hard IC	

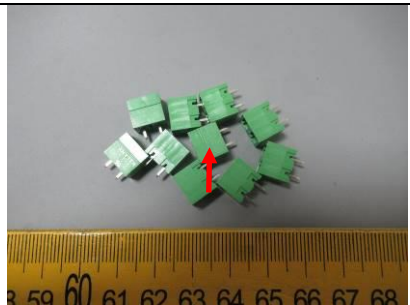
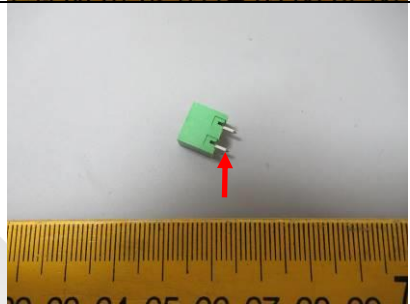
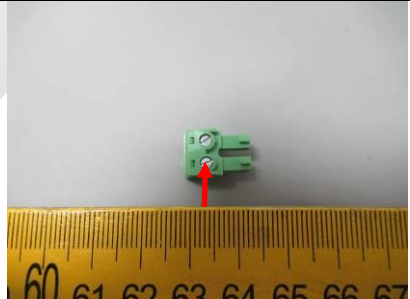


Sample No.	Description (Material, colour)	Photograph/Location
16	Light blue hard IC	
17	Silvery metal pin	
18	Blue potting compound	
19	Gray potting compound	
20	Blue rubber ring	



Sample No.	Description (Material, colour)	Photograph/Location
21	White hard plastic screw	
22	Silvery metal piece	
23	Pink rubber ring	
24	Black hard IC	
25	Silvery metal pin	



Sample No.	Description (Material, colour)	Photograph/Location
26	Green hard plastic socket	
27	Silvery metal pin	
28	Green hard plastic plug	
29	Silvery metal screw	



2. TEST RESULT(S)

2.1 SCREENING TEST

Test method: With reference to EN 62321-1:2013, EN IEC 62321-2:2021, EN 62321-3-1:2014 and EN 62321-8:2017.

For Heavy Metals and Flame Retardants, analyzed by Energy Dispersive X-ray Fluorescence Spectrometer (XRF); for phthalates, analyzed by Gas Chromatography and Mass Spectrometer (GC-MS).

Sample No.	Heavy Metals and Flame Retardants					Phthalates			
	Cd	Pb	Hg	Cr	Br	DEHP	BBP	DBP	DIBP
01	Cd	Pb	Hg	Cr	Br	DEHP	BBP	DBP	DIBP
02	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL
03	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL
04	BL	BL	BL	BL	BL	BL	BL	BL	BL
05	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL
06	BL	BL	BL	BL	NA	NA	NA	NA	NA
07	BL	BL	BL	BL	NA	NA	NA	NA	NA
08	BL	Inc. ^(a)	BL	BL	BL	BL	BL	BL	BL
09	BL	BL	BL	BL	BL	BL	BL	BL	BL
10	BL	BL	BL	BL	BL	BL	BL	BL	BL
11	BL	BL	BL	BL	BL	BL	BL	BL	BL
12	BL	BL	BL	BL	NA	NA	NA	NA	NA
13	BL	BL	BL	BL	BL	BL	BL	BL	BL
14	BL	BL	BL	BL	BL	BL	BL	BL	BL
15	BL	BL	BL	BL	NA	NA	NA	NA	NA
16	BL	BL	BL	BL	BL	BL	BL	BL	BL
17	BL	BL	BL	BL	BL	BL	BL	BL	BL
18	BL	BL	BL	BL	NA	NA	NA	NA	NA
19	BL	BL	BL	BL	BL	BL	BL	BL	BL
20	BL	BL	BL	BL	BL	BL	BL	BL	BL

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Sample No.	Heavy Metals and Flame Retardants					Phthalates			
	Cd	Pb	Hg	Cr	Br	DEHP	BBP	DBP	DIBP
21	BL	BL	BL	BL	BL	BL	BL	BL	BL
22	BL	BL	BL	BL	BL	BL	BL	BL	BL
23	BL	BL	BL	BL	NA	NA	NA	NA	NA
24	BL	BL	BL	BL	BL	BL	BL	BL	BL
25	BL	BL	BL	BL	BL	BL	BL	BL	BL
26	BL	BL	BL	BL	NA	NA	NA	NA	NA
27	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL
28	BL	BL	BL	BL	NA	NA	NA	NA	NA
29	BL	BL	BL	BL	BL	BL	BL	BL	BL

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Remark:

- "BL" denotes below limit
- "OL" denotes over limit
- "Inc." denotes inconclusive
- "NA" denotes not applicable
- "(a)" denotes further confirmation test was conducted, results are listed in 2.2 and 2.3.
- XRF screening limits in mg/kg for regulated elements in various matrices

ELEMENT	POLYMER		
	BL	INCONCLUSIVE	OL
Cd	$X \leq (70-3\sigma)$	$(70-3\sigma) < X < (130+3\sigma)$	$X \geq (130+3\sigma)$
Pb	$X \leq (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X \geq (1300+3\sigma)$
Hg	$X \leq (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X \geq (1300+3\sigma)$
Br	$X \leq (300-3\sigma)$	$X > (300-3\sigma)$	NA
Cr	$X \leq (700-3\sigma)$	$X > (700-3\sigma)$	NA

ELEMENT	METAL		
	BL	INCONCLUSIVE	OL
Cd	$X \leq (70-3\sigma)$	$(70-3\sigma) < X < (130+3\sigma)$	$X \geq (130+3\sigma)$
Pb	$X \leq (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X \geq (1300+3\sigma)$
Hg	$X \leq (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X \geq (1300+3\sigma)$
Cr	$X \leq (700-3\sigma)$	$X > (700-3\sigma)$	NA

ELEMENT	COMPLEX MATERIAL		
	BL	INCONCLUSIVE	OL
Cd	$X \leq (50-3\sigma)$	$(50-3\sigma) < X < (150+3\sigma)$	$X \geq (150+3\sigma)$
Pb	$X \leq (500-3\sigma)$	$(500-3\sigma) < X < (1500+3\sigma)$	$X \geq (1500+3\sigma)$
Hg	$X \leq (500-3\sigma)$	$(500-3\sigma) < X < (1500+3\sigma)$	$X \geq (1500+3\sigma)$
Br	$X \leq (250-3\sigma)$	$X > (250-3\sigma)$	NA
Cr	$X \leq (500-3\sigma)$	$X > (500-3\sigma)$	NA

- Screening limits in mg/kg for regulated phthalates in various matrices

PHthalATES	BL	INCONCLUSIVE
DEHP	$X < 600$	$X \geq 600$
BBP	$X < 600$	$X \geq 600$
DBP	$X < 600$	$X \geq 600$
DIBP	$X < 600$	$X \geq 600$



2.2 HEAVY METAL CONTENT

Test method: With reference to EN 62321-4:2014 /A1:2017, EN 62321-5:2014, EN 62321-7-1:2015 and EN 62321-7-2:2017, analyzed by Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES) and Ultraviolet-visible spectrophotometer (UV-Vis).

[Reporting Limit: 2.0 mg/kg for Cadmium; 5.0 mg/kg or 0.10 µg/cm² for Hexavalent Chromium, 10.0 mg/kg for Lead and Mercury.]

Sample No.	Result(s)				
	Total Cadmium	Hexavalent Chromium	Hexavalent Chromium	Total Mercury	Total Lead
07	--	/	Negative	--	--
29	--	/	--	--	1624 ^(d)

Remark:

- "mg/kg" denotes milligram per kilogram
- "µg/cm²" denotes micrograms per square centimeter
- "<" denotes less than
- "Positive" denotes the absorbance value of sample is > 0.13 µg/cm², the sample is considered to be positive for Hexavalent Chromium.
- "Inconclusive" denotes the absorbance value of sample is ≥ 0.10 µg/cm² and ≤ 0.13 µg/cm², the sample is considered to be Inconclusive for Hexavalent Chromium.
- "Negative" denotes the absorbance value of sample is < 0.10 µg/cm², the sample is considered to be negative for Hexavalent Chromium.
- "##" According to DIRECTIVE 2011/65/EU Article 4(1) and Annex II. While, positive means the presence of CrVI on tested areas and the result(s) was (were) regarded as in conflict with European Parliament and Council Directive 2011/65/EU, Article 4(1) and Annex II.
- "--" denotes tested by XRF, result is listed in 2.1
- "(d)" denotes the exempt item according to DIRECTIVE 2011/65/EU Annex III item 7(c)-I "Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound".



2.3 POLYBROMINATED BIPHENYLS (PBBs) AND POLYBROMINATED DIPHENYL ETHERS (PBDEs) CONTENT

Test Method: With reference to EN 62321-6:2015, extracted by toluene and analyzed by Gas Chromatography and Mass Spectrometer (GC-MS). [Reporting Limit : 5 mg/kg]

Test Item		Result(s) [mg/kg]				RoHS Requirement [mg/kg]
		01	02	04	26	
PBBs	Monobromobiphenyl	<5	<5	<5	<5	-
	Dibromobiphenyl	<5	<5	<5	<5	-
	Tribromobiphenyl	<5	<5	<5	<5	-
	Tetrabromobiphenyl	<5	<5	<5	<5	-
	Pentabromobiphenyl	<5	<5	<5	<5	-
	Hexabromobiphenyl	<5	<5	<5	<5	-
	Heptabromobiphenyl	<5	<5	<5	<5	-
	Octabromobiphenyl	<5	<5	<5	<5	-
	Nonabromobiphenyl	<5	<5	<5	<5	-
	Decabromobiphenyl	<5	<5	<5	<5	-
	Sum of detected PBBs	<50	<50	<50	<50	1000
PBDEs	Monobromodiphenyl ether	<5	<5	<5	<5	-
	Dibromodiphenyl ether	<5	<5	<5	<5	-
	Tribromodiphenyl ether	<5	<5	<5	<5	-
	Tetrabromodiphenyl ether	<5	<5	<5	<5	-
	Pentabromodiphenyl ether	<5	<5	<5	<5	-
	Hexabromodiphenyl ether	<5	<5	<5	<5	-
	Heptabromodiphenyl ether	<5	<5	<5	<5	-
	Octabromodiphenyl ether	<5	<5	<5	<5	-
	Nonabromodiphenyl ether	<5	<5	<5	<5	-
	Decabromodiphenyl ether	<5	<5	<5	<5	-
	Sum of detected PBDEs	<50	<50	<50	<50	1000

Remark:

- "mg/kg" denotes milligram per kilogram
- "<" denotes less than

**2.4 PHTHALATES (DEHP, BBP, DBP and DIBP) CONTENT TEST**

Test method: With reference to EN 62321-8:2017, extracted by organic solvent and analyzed by Gas Chromatography and Mass Spectrometer (GC-MS). [Reporting Limit : 50 mg/kg]

Test Item	Result(s) [mg/kg]	RoHS Requirement [mg/kg]
	02	
Di-iso-butyl Phthalate (DIBP)	<50	<1000
Di-butyl Phthalate (DBP)	211	<1000
Butyl-benzyl Phthalate (BBP)	<50	<1000
Di-(2-ethyl-hexyl) Phthalate (DEHP)	<50	<1000

Remark:

- "mg/kg" denotes milligram per kilogram
- "<" denotes less than





APPENDIX I: Product Model

Product: Hall Transducer	Test model: AHKC-EKA
	
Additional models: AHKC-EKA, AHKC-EKAA, AHKC-EKDA, AHKC-EKB, AHKC-EKBA, AHKC-EKBDA, AHKC-EKC, AHKC-EKCA, AHKC-EKCDA, AHKC-K, AHKC-KAA, AHKC-KDA, AHKC-H, AHKC-HAA, AHKC-HDA, AHKC-KA, AHKC-HB, AHKC-HBAA, AHKC-HBDA, AHKC-E, AHKC-LT, AHKC-BS, AHKC-C, AHKC-BSA, AHKC-F, AHKC-FA, AHKC-HAT, AHKC-EA, AHLC-LTA, AHLC-EA, AHLC-EB, AHKC-EB, AHBC-LTA, AHBC-LT1005, AHBC-LF, AHKC-KAS, AHKC-KAL, AHKC-HAB, AHKC-DHAB, AHKC-HC5F, AHBC-LA, AHBC-LAP, AHBC-LF305, AHBC-LF505	

Remark:

1. The report covers material testing on specified samples.
2. The tested materials covered by the report were declared by the manufacturer to be used on the additional model.

--END OF REPORT--