

Verification Report

No. CANEC2214043503

Date: 29 Aug 2022

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Client Name : HC OPTICAL SCIENCE AND TECH CO., LTD.

Client Address : C-214, INNOVATION BUILDING, INFORMATION INDUSTRIAL ESTATE, HIGH AND NEW TECHNOLOGY INDUSTRIAL DEVELOPMENT ZONE AT GUILIN IN GUANGXI PROVINCE

Sample Name : MEMS 1x16 Optical Switch

Tested Basic Model No. 1x16

(P.O.No) :

Client Ref. Info. : Used for: MEMS 1xN Optical Switch

The above sample(s) and information were provided by the client.

SGS Job No. : CP22-036001 - GZ

Date of Sample Received : 29 Jun 2022

Verification Period : 29 Jun 2022 - 23 Aug 2022

Verification Requested : With reference to RoHS Directive (EU) 2015/863 amending 2011/65/EU.

Verification Method(s) : Please refer to next page(s).

Verification Result(s) : Please refer to next page(s).

Test Result Summary

Test Items	Conclusion
EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)	PASS

Signed for and on behalf of
SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

Tyler Zhang

Tyler Zhang
Approved Signatory

scan to see the report



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SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch Testing Center Chemical Laboratory.

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Photo of Submitted Sample



Verification Method(s) :

1. With reference to IEC 62321-2:2021, disassembly and disjointment were performed for the submitted samples.
2. With reference to IEC 62321-1:2013, tests were performed for the samples indicated by the photos in this report
 - (1) With reference to IEC 62321-3-1:2013, screening by EDXRF spectroscopy.
 - (2) Wet chemical test method: With reference to IEC 62321-4:2013+A1:2017, IEC62321-5:2013, IEC 62321-7-1:2015, IEC 62321-7-2:2017, ISO 17075-1:2017, IEC 62321-6:2015 and IEC62321-8:2017, analyzed by ICP-OES, UV-Vis and GC-MS.

Verification Part Description :

SN ID	Sample No	SGS Sample ID	Description
SN1	A1	CAN22-140435.001	White adhesive plastic sheet with black printing
SN2	A2	CAN22-140435.002	Red sponge ring
SN3	A3	CAN22-140435.003	Transparent plastic shell
SN4	A4	CAN22-140435.004	Transparent plastic shell
SN5	A5	CAN22-140435.005	Transparent material thread
SN6	A6	CAN22-140435.006	Black rubber part



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SN ID	Sample No	SGS Sample ID	Description
SN7	A7	CAN22-140435.007	Silvery adhesive plastic sheet with black printing
SN8	A8	CAN22-140435.008	Silvery metal shell
SN9	A9	CAN22-140435.009	Brown transparent plastic part
SN10	A10	CAN22-140435.010	Silvery metal ring
SN11	A11	CAN22-140435.011	Transparent glass sheet
SN12	A12	CAN22-140435.012	Golden metal part
SN13	A13	CAN22-140435.013	Golden metal pin
SN14	A14	CAN22-140435.019	Black plastic part
SN15	A15	CAN22-140435.020	Silvery metal part
SN16	A16	CAN22-140435.021	Black body
SN17	A17	CAN22-140435.022	Grey material ring



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Verification Results :

Test Item(s)	A1	A2	A3	A4	A5	A6	A7	A8
Pb	BL	BL	BL	BL	BL	BL	BL	BL
Cd	BL	BL	BL	BL	BL	BL	BL	BL
Hg	BL	BL	BL	BL	BL	BL	BL	BL
Cr(VI)▼	BL	BL	BL	BL	BL	BL	BL	ND
PBBs	BL	BL	BL	BL	BL	ND	BL	--
PBDEs	BL	BL	BL	BL	BL	ND	BL	--
DBP	ND	ND	BL	BL	BL	ND	BL	---
BBP	ND	ND	BL	BL	BL	ND	BL	---
DEHP	ND	ND	BL	BL	BL	ND	BL	---
DIBP	ND	ND	BL	BL	BL	ND	BL	---
Conclusion	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Test Item(s)	A9	A10	A11	A12	A13	A14	A15	A16
Pb	BL	BL	BL	BL	BL	BL	BL	BL
Cd	BL	BL	BL	BL	BL	BL	BL	BL
Hg	BL	BL	BL	BL	BL	BL	BL	BL
Cr(VI)▼	BL	BL	BL	ND	BL	BL	BL	BL
PBBs	BL	--	BL	--	--	ND	---	BL
PBDEs	BL	--	BL	--	--	ND	---	BL
DBP	ND	---	---	---	---	ND	---	ND
BBP	ND	---	---	---	---	ND	---	ND
DEHP	ND	---	---	---	---	ND	---	ND
DIBP	ND	---	---	---	---	ND	---	ND
Conclusion	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Test Item(s)	A17
Pb	702644▲
Cd	BL
Hg	BL
Cr(VI)▼	BL
PBBs	BL



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Test Item(s)	A17
PBDEs	BL
DBP	ND
BBP	ND
DEHP	ND
DIBP	ND
Conclusion	PASS



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Notes:

(1) Interpretation of screening results by X-ray fluorescence spectrometry (XRF):

(a) Screening limits in mg/kg for regulated elements in various matrices according to IEC 62321-1:2013 Annex A as below table.

Element	Polymer	Metal	Composite Materials
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Br	$BL \leq (300-3\sigma) < X$	Not applicable	$BL \leq (250-3\sigma) < X$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$

(b) If the maximum allowed level restricts PBB/PBDE and Cr(VI) rather than Br and Cr, the exceptions are the XRF determinations of Br and Cr. If the quantitative results for the elements Br and/or are higher than the limit (for Br calculated based on the stoichiometry of Br in the most common congeners of PBB/PBDE), the sample is “inconclusive”.

(c) Results are obtained by EDXRF for primary screening, LOD = Limit of Detection, BL = Below Limit, OL = C Limit, IN (The symbol X marks the region)= Inconclusive, where further investigation is necessary, and further chemical testing by ICP-OES (for Cd, Pb, Hg), UV-Vis (for Cr(VI)) and GC-MS (for PBBs/PBDE) are recommended to be performed.

(d) The EDXRF screening test for RoHS elements – The reading may be different to the actual content in the sample be of non-uniformity composition.

(2) Screening results of Phthalates (PHTH) are for primary screening, and further chemical testing by GC-MS (DBP, BBP, DEHP and DIBP) are recommended to be performed if the concentration exceeds the below warning value (unit: mg/kg).

Test Items	CAS No.	Polymer/ Composite Materials
Dibutyl Phthalate (DBP)	84-74-2	$BL \leq 600 < X$
Benzylbutyl Phthalate (BBP)	85-68-7	$BL \leq 600 < X$
Bis(2-ethylhexyl) Phthalate (DEHP)	117-81-7	$BL \leq 600 < X$
Diisobutyl Phthalate (DIBP)	84-69-5	$BL \leq 600 < X$

(3) Interpretation of results by chemical tests:

(a) mg/kg = 0.0001%, MDL=Method detection Limit, ND = Not Detected (<MDL), --- = Not Applicable.



(b) Unit and MDL in wet chemical test

Test Items	Pb	Cd	Hg	DBP	BBP	DEHP	DIBP
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MDL	10	10	10	100	100	100	100

The MDL for single compound of PBBs and PBDEs is 100 mg/kg.

MDL of Cr(VI) for polymer, composite and leather sample is 10 mg/kg.

MDL of Cr(VI) for metal sample is 0.10µg/cm².

(c) ▼ =Metal sample

a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13µg/cm².

The sample coating is considered to contain Cr(VI)

b. The sample is negative for Cr(VI) if Cr(VI) is ND (concentration less than 0.10µg/cm²).

The coating is considered a non-Cr(VI) based coating

c. The result between 0.10µg/cm² and 0.13µg/cm² is considered to be inconclusive

- unavoidable coating variations may influence the determination

Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

(4) Restricted substances and maximum concentration values tolerated by weight in homogeneous materials under RoHS Directive: Cd: 0.01%, Pb/Hg/Cr(VI)/PBBs/PBDEs/DEHP/DBP/BBP/DIBP: 0.1%. The limit is quoted from RoHS Directive (EU) 2015/863.

(5) IEC 62321 series is equivalent to EN 62321 series.

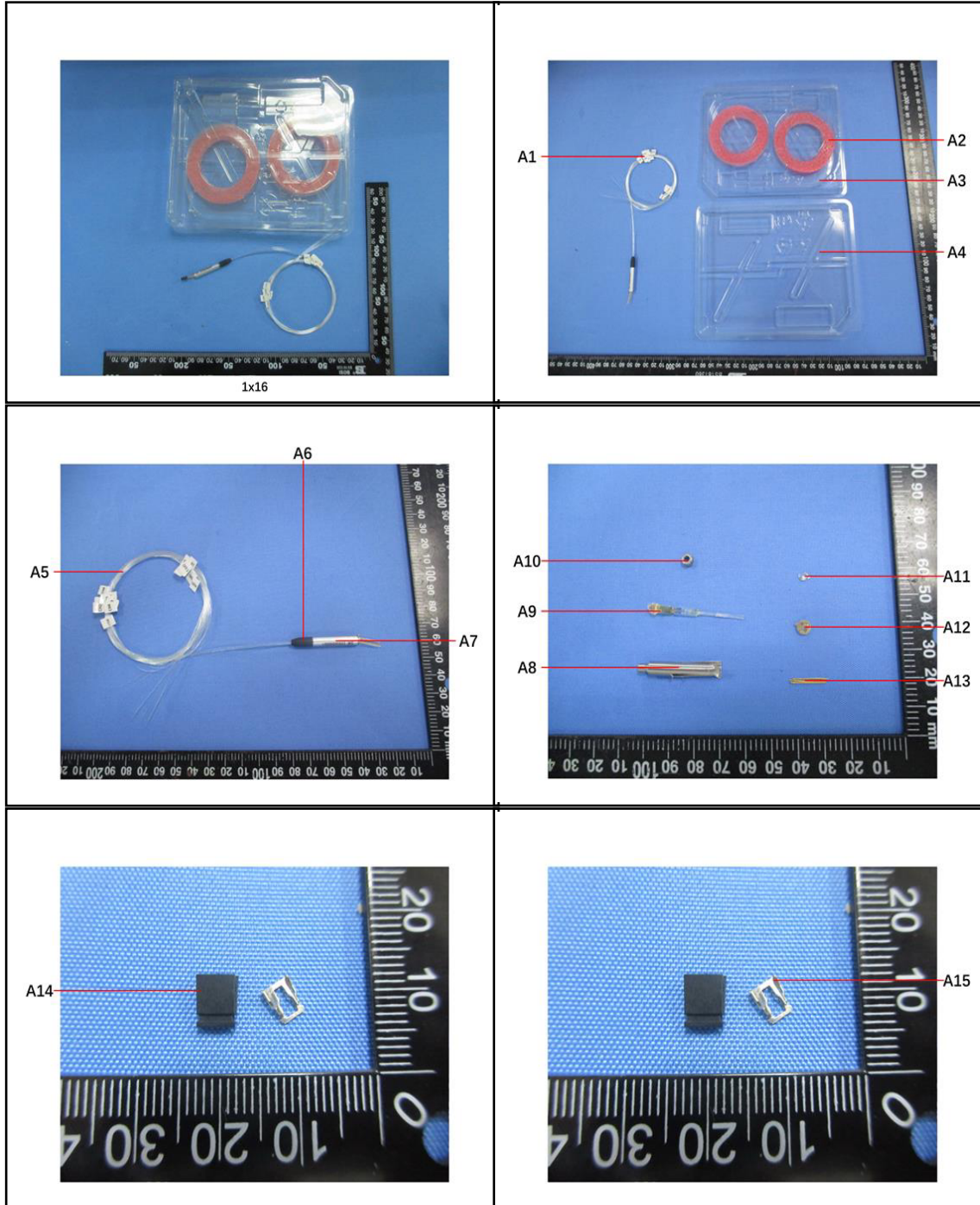
(6)▲= According to the declaration from the client, Lead (Pb) in No.A17 is exempted by EU RoHS directive 2011/65/EU based on [ANNEX III 7(c)-I]: Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound.

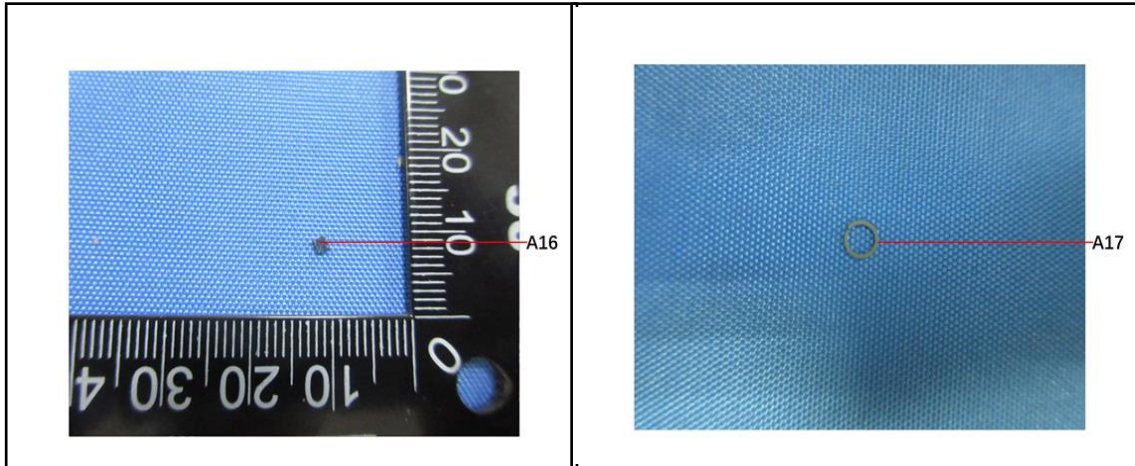
(7)Results & Photos of this report refer to verification report CANEC2214043501.

Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule ($w=0$) stated in ILAC-G8:09/2019.



Sample photo:





SGS authenticate the photo on original report only

*** End of Report ***

