TEST REPORT

Applicant : **Yueqing Langir Electric Co., Ltd**

Address : **No.10, Longhe East Road, Liushi Town, Yueqing City, Wenzhou, China**

Report on the submitted samples said to be:

Sample Name : **ANTI VANDAL SWITCH, CAPACITIVE SWITCH, PIEZO SWITCH, INDICATOR LAMP**

Trade Mark : **N/A**

Style No. : **V12, V16, V19, VS19, V22, L12, L16, LS16, L19, L19A, LS19, L19M, L19B, L19Y, L22, L22A, L22M, L22B, L25, L30B, L28, L30, L35, L40, LF19, L16T, L19T, L22T, L22O, L29S, L22S, L19U, L22U, L25U, CP16, CP19, CP22, CP25, CP30, PZ12, PZ16, PZ19, PZ22, PZ25, PZ30, PP22, PI SERIES, PV SERIES**

Testing Period : **June 28, 2022 ~ July 07, 2022**

Results : **Please refer to next page(s).**

TEST REQUEST	CONCLUSION
According to the customer's request, based on the performed tests on submitted sample, the result of Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), PBBs, PBDEs, Dibuyl Phthalate(DBP), Benzylbutyl Phthalate(BBP), Bis(2-ethylhexyl) Phthalate(DEHP), Diispbutyl phthalate(DIBP) content comply with the limit requirement as set of RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.	**Pass**

Signed for and on behalf of LCS

Imanol Yan

Imanol Yan

Results:

A.EU RoHS Directive 2011/65/EU and its amendment directives on XRF

Test method: With reference to IEC 62321-3-1:2013, Screening by X-ray Fluorescence Spectroscopy (XRF)

Seq. No.	Tested Part(s)	Results						Date of sample submission/resubmission
		Cd	Pb	Hg	Cr▼	Br▼		
						PBBs	PBDEs	
1	Silver nut	BL	OL	BL	BL	/	/	2022-06-28
2	Black plastic	BL	BL	BL	BL	X	X	2022-06-28
3	Yellow metal	BL	BL	BL	BL	/	/	2022-06-28
4	Yellow metal	BL	BL	BL	BL	/	/	2022-06-28
5	Silver spring	BL	BL	BL	X	/	/	2022-06-28
6	Orange plastic	BL	BL	BL	BL	X	X	2022-06-28
7	Yellow metal	BL	BL	BL	BL	/	/	2022-06-28
8	Silver metal	BL	BL	BL	X	/	/	2022-06-28
9	Blue plastic	BL	BL	BL	BL	BL	BL	2022-06-28
10	Translucent plastic	BL	BL	BL	BL	BL	BL	2022-06-28
11	Silver metal	BL	BL	BL	X	/	/	2022-06-28
12	Black washer	BL	BL	BL	BL	BL	BL	2022-06-28
13	Silver nut	BL	OL	BL	BL	/	/	2022-06-28
14	Black plastic	BL	OL	BL	BL	BL	BL	2022-06-28
15	Black plastic wire sheath	BL	BL	BL	BL	BL	BL	2022-06-28
16	Silver metal	BL	BL	BL	X	/	/	2022-06-28
17	Red plastic wire sheath	BL	BL	BL	BL	BL	BL	2022-06-28
18	Translucent plastic	BL	BL	BL	BL	BL	BL	2022-06-28
19	Black washer	BL	BL	BL	BL	BL	BL	2022-06-28
20	Silver nut	X	OL	BL	BL	/	/	2022-06-28
21	Silver metal	BL	BL	BL	X	/	/	2022-06-28
22	Silver spring	BL	BL	BL	X	/	/	2022-06-28
23	Silver metal	BL	BL	BL	X	/	/	2022-06-28

Seq. No.	Tested Part(s)	Results						Date of sample submission/resubmission
		Cd	Pb	Hg	Cr▼	Br▼		
						PBBs	PBDEs	
24	Translucent plastic	BL	BL	BL	BL	BL	BL	2022-06-28
25	White plastic wire sheath	BL	BL	BL	BL	BL	BL	2022-06-28
26	Green plastic wire sheath	BL	BL	BL	BL	BL	BL	2022-06-28
27	Blue plastic wire sheath	BL	BL	BL	BL	BL	BL	2022-06-28
28	PCB	BL	BL	BL	BL	BL	BL	2022-06-28
29	Yellow lights	BL	BL	BL	BL	/	/	2022-06-28
30	Patch capacitance	BL	BL	BL	BL	/	/	2022-06-28
31	Tin solder	BL	BL	BL	BL	/	/	2022-06-28
32	Chip resistor	BL	BL	BL	BL	/	/	2022-06-28

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Note:

(1) Results were obtained by XRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-Vis (for Cr(VI)) and GC-MS (for PBBs, PBDEs) are recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1:2013.

Element	Unit	Non-metal	Metal	Composite Material
Cd	mg/kg	BL≤70-3σ<X <130+3σ≤OL	BL≤70-3σ<X <130+3σ≤OL	BL≤50-3σ<X <150+3σ≤OL
Pb	mg/kg	BL≤700-3σ<X <1300+3σ≤OL	BL≤700-3σ<X <1300+3σ≤OL	BL≤500-3σ<X <1500+3σ≤OL
Hg	mg/kg	BL≤700-3σ<X <1300+3σ≤OL	BL≤700-3σ<X <1300+3σ≤OL	BL≤500-3σ<X <1500+3σ≤OL
Cr	mg/kg	BL≤700-3σ<X	BL≤700-3σ<X	BL≤500-3σ<X
Br	mg/kg	BL≤300-3σ<X	--	BL≤250-3σ<X

Note:

BL = Below Limit

OL = Over Limit

X = Inconclusive

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

(3) The maximum permissible limit is quoted from the document 2015/863/EC amending RoHS directive 2011/65/EU:

(4) ▼=For restricted substances PBBs and PBDEs, the results show the total Br content; The restricted substance was Cr(VI), and the results showed the total Cr content

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RoHS Restricted Substances	Maximum Concentration Value (mg/kg) (by weight in homogenous materials)
Cadmium (Cd)	100
Lead (Pb)	1000
Mercury (Hg)	1000
Hexavalent Chromium (Cr(VI))	1000
Polybrominated biphenyls (PBBs)	1000
Polybrominated diphenylethers (PBDEs)	1000
Dibuyl Phthalate(DBP)	1000
Benzylbutyl Phthalate(BBP)	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	1000
Diispbutyl phthalate(DIBP)	1000

Disclaimers:

This XRF Screening 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 report is sufficient for its/his/her purposes.

The result shown in this XRF screening 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 are required to obtain quantitative data.

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B. EU RoHS Directive 2011/65/EU and its amendment Directives 2015/863/EU on Lead, Cadmium, Mercury, Hexavalent Chromium, PBBs, PBDEs, DBP, BBP, DEHP, DIBP content.

Test method:

Lead(Pb) & Cadmium(Cd) Content:
With reference to IEC 62321-5:2013, by acid digestion and analysis was performed by inductively coupled plasma atomic emission spectrometer (ICP-OES)

Hexavalent Chromium(Cr(VI)) Content:
With reference to IEC 62321-7-1:2015 or IEC 62321-7-2:2017, by alkaline digestion and analysis was performed by UV-visible spectrophotometer (UV-Vis)

BBP DBP DEHP & DIBP Content:

With reference to IEC 62321-8:2017, by solvent extraction and analysis was performed by gas chromatographic-mass spectrometer (GC-MS)

PBBs & PBDEs Content:
With reference to IEC 62321-6:2015, by solvent extraction and analysis was performed by gas chromatographic-mass spectrometer (GC-MS)

1) The test results of Lead (Pb) and Cadmium (Cd)

Item	Unit	MDL	Results			Limit
			1	13	14	
Lead Content (Pb)	mg/kg	5	19497#3	27855#3	498	1000
Cadmium content(Cd)	mg/kg	5	N.D.	N.D.	N.D.	100

Item	Unit	MDL	Results	Limit
			20	
Lead Content (Pb)	mg/kg	5	27990#3	1000
Cadmium content(Cd)	mg/kg	5	N.D.	100

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2) The test results of Hexavalent Chromium (Cr(VI))(metal)

Item	Unit	MDL	Results			Limit
			5	8	11	
HexavalentChromium(Cr(VI))▼	ug/cm^2	0.10	N.D.	N.D.	N.D.	-

Item	Unit	MDL	Results			Limit
			16	21	22	
HexavalentChromium(Cr(VI))▼	ug/cm^2	0.10	N.D.	N.D.	N.D.	-

Item	Unit	MDL	Results	Limit
			23	
HexavalentChromium(Cr(VI))▼	ug/cm^2	0.10	N.D.	-

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Note:

- MDL = Method Detection Limit
- /= Not apply
- LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 μg/cm^2
- ▼ = a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13ug/cm^2. The sample coating is considered to contain Cr(VI)
  b. The sample is negative for Cr(VI) if Cr(VI) is N.D.(concentration less than 0.10ug/cm^2). The sample coating is considered a non- Cr(VI) based coating
  c. The result between 0.10μg/cm^2 and 0.13μg/cm^2 is considered to be inconclusive, unavoidable coating variations may influence the determination
- Information on storage conditions and production date of the tested samples is unavailable and thus Cr(VI) results represent status of the sample at the time of testing
- mg/kg = ppm=parts per million
- N.D.=Not Detected(<MDL or LOQ)

#1 According to RoHS directive 2011/65/EU and its amendments, Lead is exempted in glass of cathode ray tubes, electronic components and fluorescent tubes.

#2 According to RoHS directive 2011/65/EU and its amendments, Lead is exempted in electronic ceramic parts (e.g. piezoelectronic devices).

#3 According to RoHS directive 2011/65/EU and its amendments, Lead is exempted as an alloying element in Copper containing up to 4% (40000ppm) by weight.

#4 According to RoHS directive 2011/65/EU and its amendments, Lead is exempted in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead).

#5 According to the statement provided by the customer, according to RoHS directive 2011/65/EU and its amendments, Lead is exempted as an alloying element in Aluminum containing up to 0.4% (4000ppm) by weight.

#6 According to the statement provided by the customer, according to RoHS directive 2011/65/EU and its amendments, Cadmium and its compounds in electrical contact is exempted.

#7 According to the statement provided by the customer, according to RoHS directive 2011/65/EU and its Amendments，Lead is exempted in steel for machining purposes and in galvanised steel containing up to 0.35% (3500ppm) by weight.

- Flow chart appendix is included.
- Photo appendix is included.

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3) The test results of DBP、BBP、DEHP & DIBP

Item	Unit	MDL	Results			Limit
			14	28	18+24	
Dibuyl Phthalate(DBP)	mg/kg	50	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	50	N.D.	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	50	N.D.	N.D.	N.D.	1000
Diispbutyl phthalate(DIBP)	mg/kg	50	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results		Limit
			2+6+9	10+12+19	
Dibuyl Phthalate(DBP)	mg/kg	50	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	50	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	50	N.D.	N.D.	1000
Diispbutyl phthalate(DIBP)	mg/kg	50	N.D.	N.D.	1000

Item	Unit	MDL	Results	Limit
			15+17+25+26+27	
Dibuyl Phthalate(DBP)	mg/kg	50	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	50	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	50	N.D.	1000
Diispbutyl phthalate(DIBP)	mg/kg	50	N.D.	1000

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4) The test results of PBBs & PBDEs

Item	Unit	MDL	Results		Limit
			2	6	
Polybrominated Biphenyls (PBBs)					
Monobromobiphenyl	mg/kg	5	N.D.	N.D.	
Dibromobiphenyl	mg/kg	5	N.D.	N.D.	
Tribromobiphenyl	mg/kg	5	N.D.	N.D.	
Tetrabromobiphenyl	mg/kg	5	N.D.	N.D.	
Pentabromobiphenyl	mg/kg	5	N.D.	N.D.	
Hexabromobiphenyl	mg/kg	5	N.D.	N.D.	
Heptabromobiphenyl	mg/kg	5	N.D.	N.D.	
Octabromobiphenyl	mg/kg	5	N.D.	N.D.	
Nonabromodiphenyl	mg/kg	5	N.D.	N.D.	
Decabromodiphenyl	mg/kg	5	N.D.	N.D.	
Total content	mg/kg	/	N.D.	N.D.	1000
Polybrominated Diphenylethers (PBDEs)(Mon-Deca)					
Monobromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Dibromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Tribromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Tetrabromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Pentabromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Hexabromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Heptabromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Octabromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Nonabromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Decabromodiphenyl ether	mg/kg	5	N.D.	N.D.	
Total content	mg/kg	/	N.D.	N.D.	1000

Remark:

- mg/kg = ppm
- N.D. = Not detected
- MDL=Method detected limited
- Flow chart appendix is included
- Photo appendix is included.

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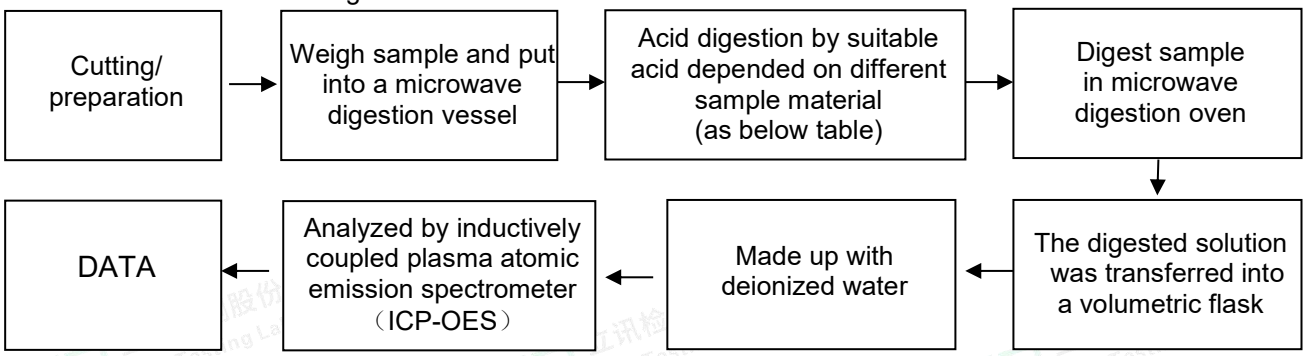
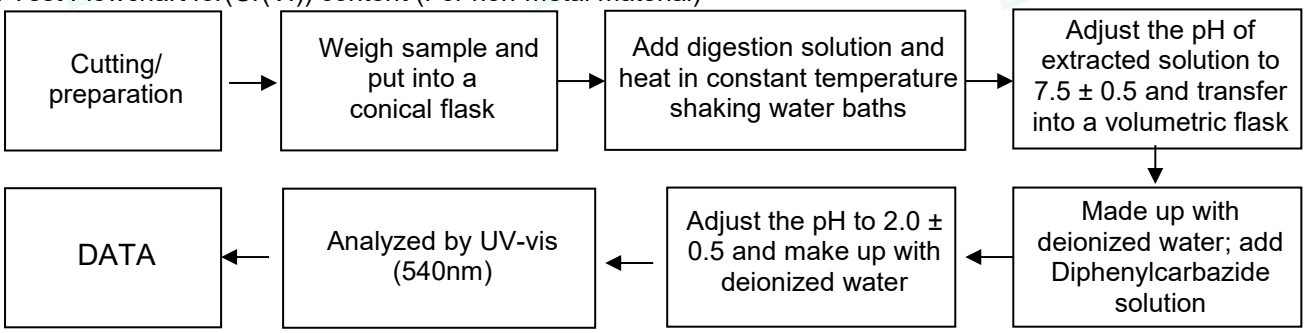
Appendix

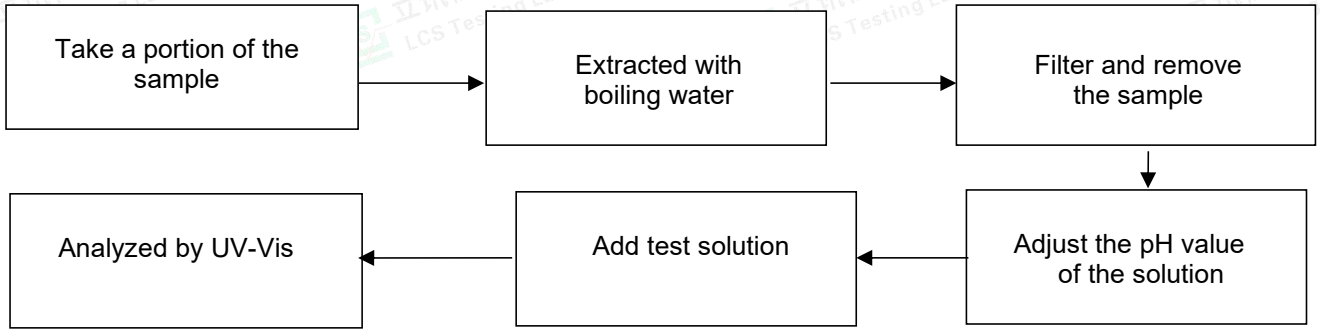
1. Test Flow chart for Cd/Pb /Hg content



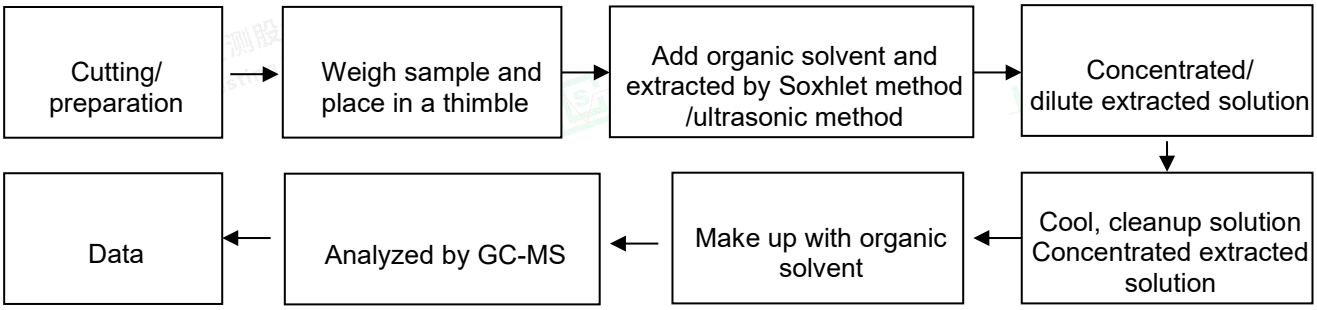
2. Test Flowchart for(Cr(VI)) content (For non-metal material)



Test Flowchart for (Cr(VI)) content (For metal material)



3. Test Flow chart for PBBs & PBDEs & DBP & BBP & DEHP & DIBP content



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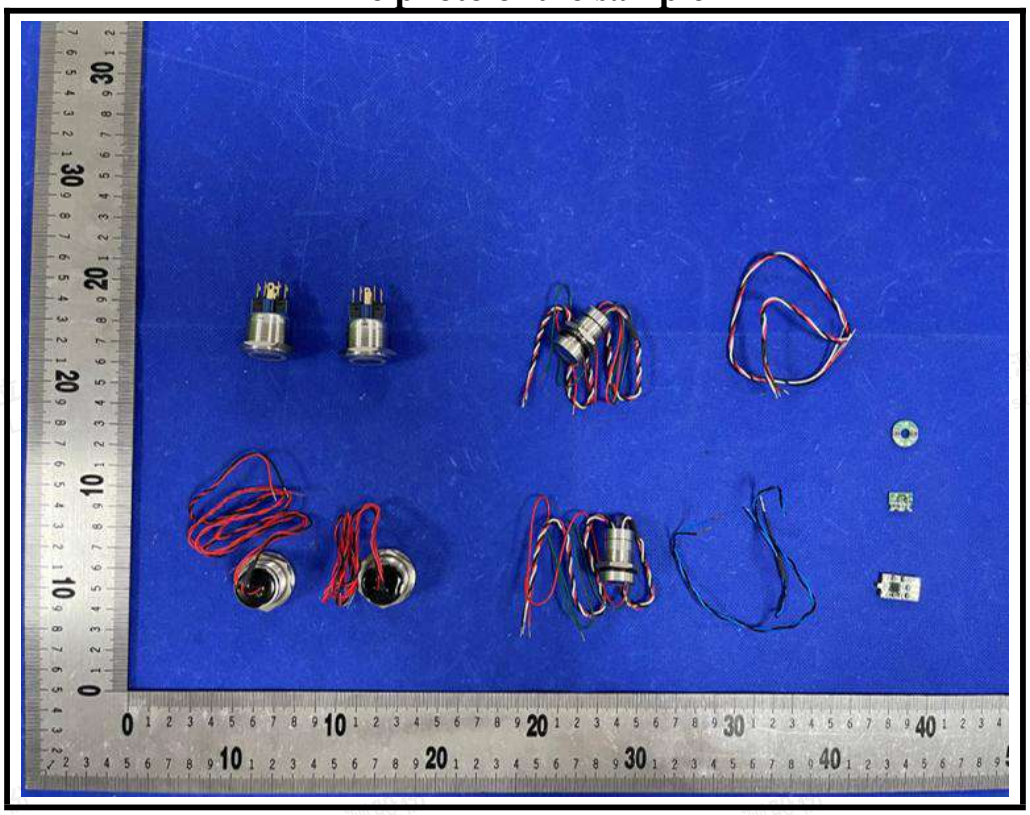
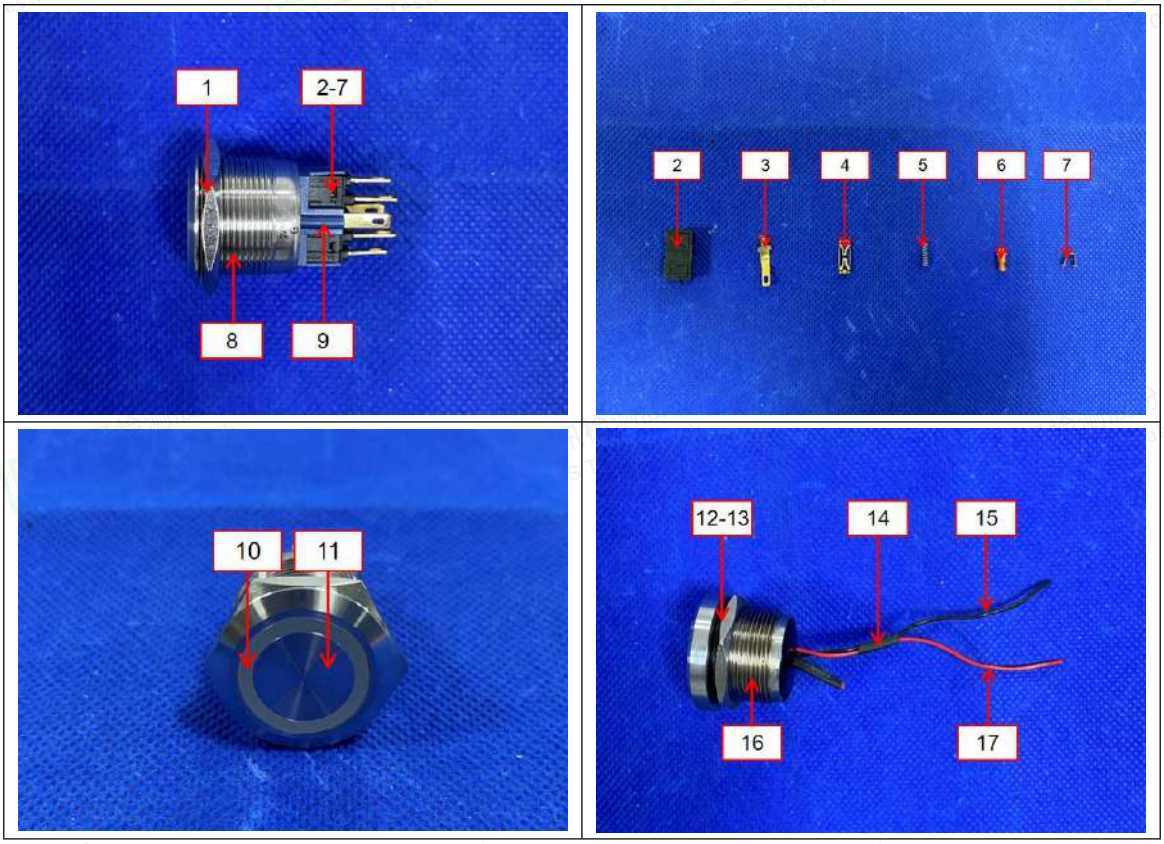
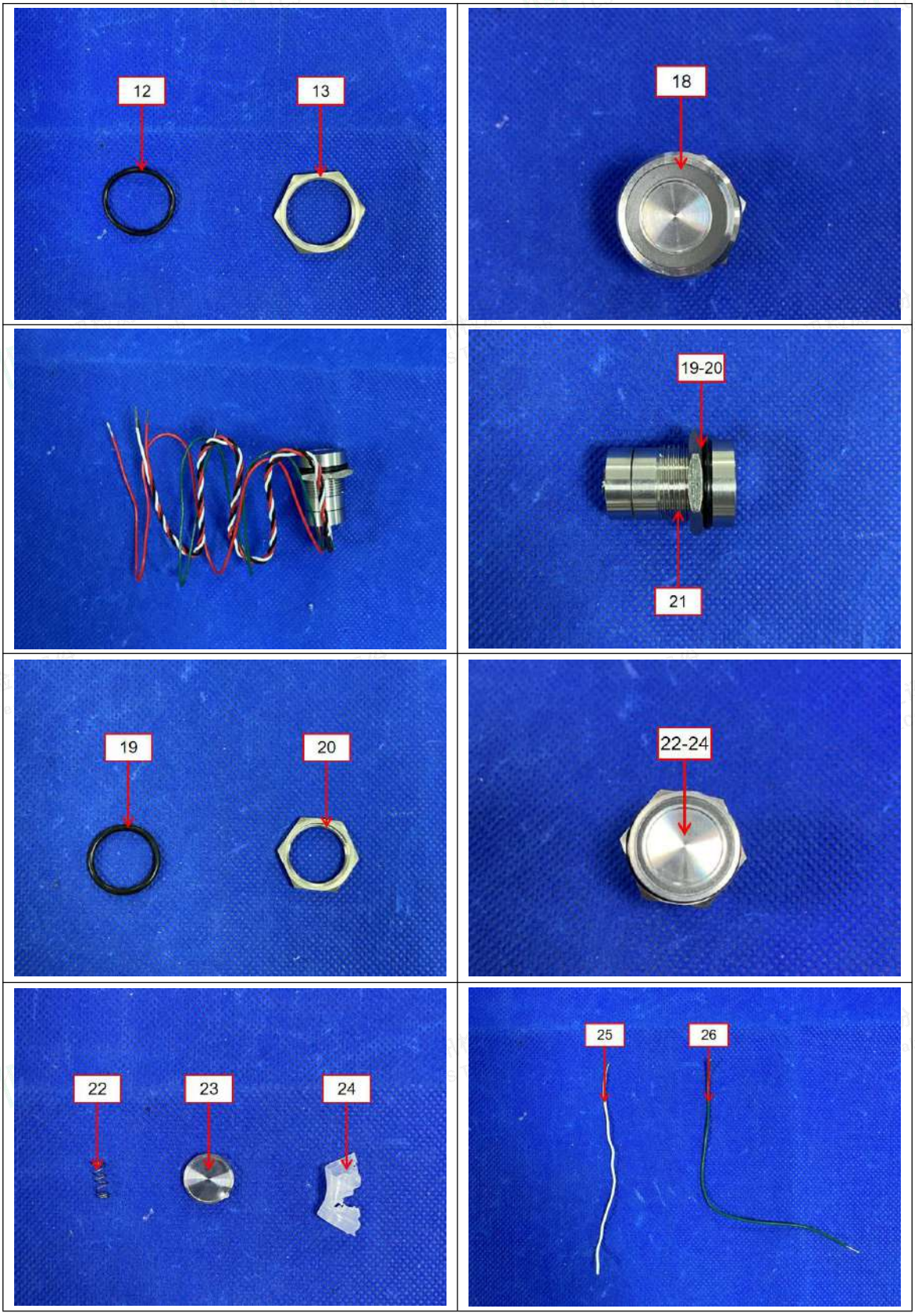
The photo of the sample



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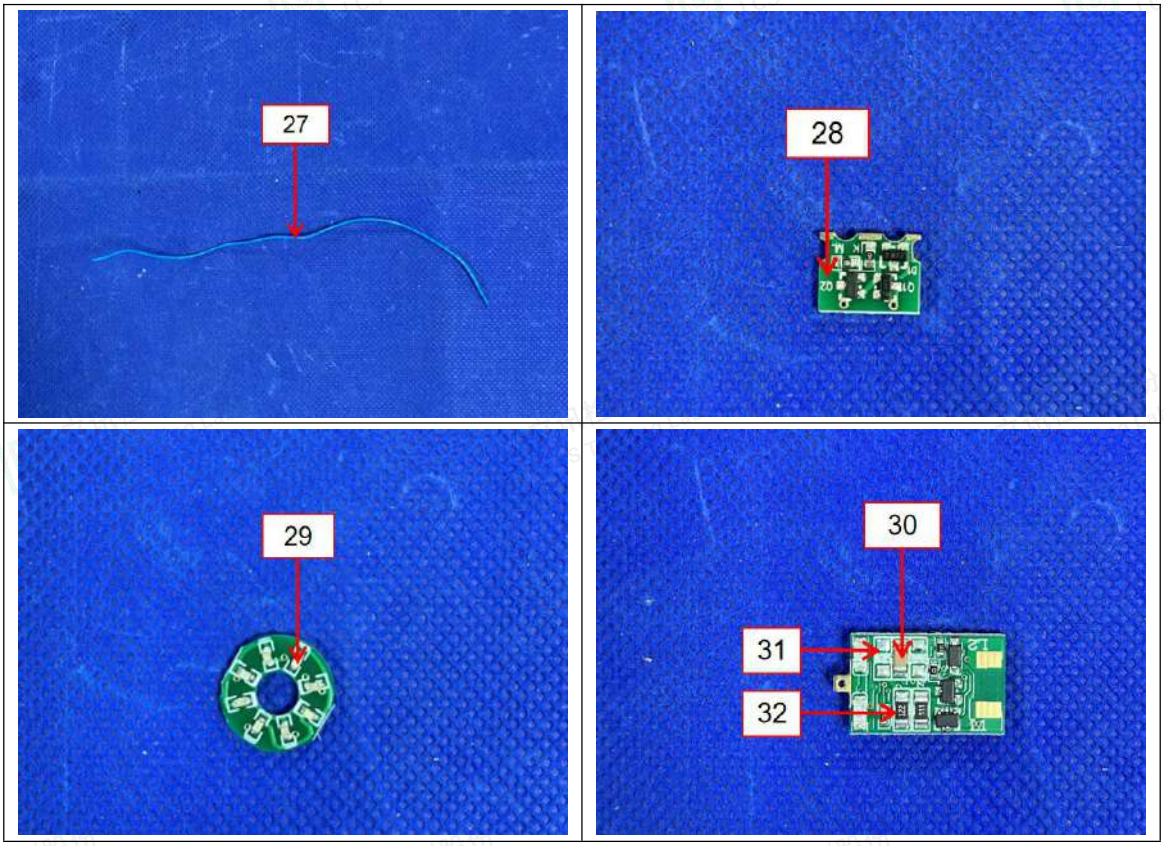

LCS authenticate the photo on original report only

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