



# TEST REPORT

**Report No.** ..... : WTF20F05031648C

**Applicant** ..... : Hangzhou Yideng Lighting Co., Ltd.

**Address** ..... : Room 1304, Building 4, No.859 West Shixiang Road, Xihu District, Hangzhou, Zhejiang, 310030, China

**Manufacturer** ..... : Hangzhou Yideng Lighting Co., Ltd.

**Address** ..... : Room 1304, Building 4, No.859 West Shixiang Road, Xihu District, Hangzhou, Zhejiang, 310030, China

**Sample Name** ..... : LED bulbs

**Model No.** ..... : OL-A60D-7-XXK, OL-A60D-7.5-XXK, OL-A60D-7.7-XXK, OL-A60D-7.8-XXK, OL-A60D-8-XXK, OL-A60D-9-XXK

**Sample Receiving Date**.... : 2020-05-30

**Testing Period**..... : 2020-05-30 to 2020-06-22

**Date of Issue** ..... : 2020-06-23

**Test Result** ..... : Please refer to next page (s)

**Note**..... : As per client's requirement, all results of specimen are extracted from report No. WTF20F05031601C.

**Remarks:**

The results shown in this test report refer only to the sample(s) tested; this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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*Swing Liang*

Humour.Wu/ Project Engineer

Swing.Liang / Technical Manager



- Test Requested**..... : In accordance with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863.
- Test Method**..... :
  - 1) With Reference to IEC 62321-2:2013, disassembly, disjunction and mechanical sample preparation
  - 2) With Reference to IEC 62321-3-1:2013, screening - Lead, mercury, cadmium, total chromium and total bromine by X-ray fluorescence spectrometry
  - 3) With reference to IEC 62321-4:2013+AMD1:2017 CSV, determination of Mercury by ICP-OES
  - 4) With reference to IEC 62321-5:2013, determination of Lead and Cadmium by ICP-OES
  - 5) With reference to IEC 62321-7-2: 2017 and IEC 62321-7-1: 2015, determination of Hexavalent Chromium by UV-Vis
  - 6) With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS
  - 7) With reference to IEC 62321-8:2017, determination of Phthalates content by GC-MS.
- Test Conclusion**..... : **Pass** (Based on the performed tests on the submitted samples, the results comply with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863)



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**Test Results:****1. Lead, Mercury, Cadmium, Hexavalent Chromium, PBBs and PBDEs**

Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
1	White plastic shell of lamp	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
2	White plastic shell with yellow coating of lamp	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
3	Silvery metal core of lamp	BL	BL	BL	BL	BL	NA
4	Silvery metal shell	BL	BL	BL	BL	BL	NA
5	Semi-transparent plastic cover of lamp	BL	BL	BL	BL	BL	NA
6	Silvery metal screw	BL	BL	BL	BL	BL	NA
7	White plastic base	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
8	Chip LED	BL	BL	BL	BL	BL	NA
9	White plastic shell	BL	BL	BL	BL	BL	NA
10	Silvery metal sheet	BL	BL	BL	BL	BL	NA
11	Silvery metal sheet with white plating	BL	BL	BL	BL	BL	NA
12	Solder	BL	IN	BL	BL	BL	Pb : 299
13	White glue	BL	BL	BL	BL	BL	NA
14	Transparent glue	BL	BL	BL	BL	BL	NA
15	Red heat-shrinkable tube of inductor	BL	BL	BL	BL	BL	NA
16	Dark grey magnetic core of inductor	BL	BL	BL	IN	BL	Cr <sup>6+</sup> : ND
17	Coppery metal wire of inductor	BL	BL	BL	BL	BL	NA
18	Red body of capacitor	BL	BL	BL	BL	BL	NA
19	Green plastic film of electrolytic capacitor	BL	BL	BL	BL	BL	NA



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
20	Silvery metal shell of electrolytic capacitor	BL	BL	BL	BL	BL	NA
21	Black rubber stopper of electrolytic capacitor	BL	BL	BL	BL	BL	NA
22	Grey metal foil of electrolytic capacitor	BL	BL	BL	BL	BL	NA
23	Silvery-grey metal foil of electrolytic capacitor	BL	BL	BL	BL	BL	NA
24	Brown paper of electrolytic capacitor	BL	BL	BL	BL	BL	NA
25	Transparent plastic adhesive tape of electrolytic capacitor	BL	BL	BL	BL	BL	NA
26	Transparent glass shell of fuse	BL	BL	BL	BL	BL	NA
27	Silvery metal cover of fuse	BL	BL	BL	BL	BL	NA
28	Silvery metal wire of fuse	BL	BL	BL	BL	BL	NA
29	White fibrous wire of fuse	BL	BL	BL	BL	BL	NA
30	Red heat-shrinkable tube of fuse	BL	BL	BL	BL	BL	NA
31	Grey resistor with multicolour coating	BL	BL	BL	BL	BL	NA
32	Transparent plastic adhesive label of inductor	BL	BL	BL	BL	BL	NA
33	Yellow plastic adhesive tape of inductor	BL	BL	BL	BL	BL	NA
34	Dark grey magnetic core of inductor	BL	BL	BL	IN	BL	Cr <sup>6+</sup> : ND
35	Black plastic bobbin of inductor	BL	BL	BL	BL	BL	NA
36	Coppery metal winding of inductor	BL	BL	BL	BL	BL	NA
37	Silvery metal pin	BL	BL	BL	BL	BL	NA
38	Chip resistor	BL	*OL	BL	BL	BL	NA
39	Chip resistor	BL	BL	BL	IN	BL	Cr <sup>6+</sup> : ND



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
40	Chip capacitor	BL	BL	BL	BL	BL	NA
41	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
42	Chip diode	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
43	Chip IC	BL	BL	BL	BL	BL	NA
44	Chip rectifier	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
45	Solder	BL	BL	BL	BL	BL	NA
46	Chip diode	BL	BL	BL	BL	BL	NA
47	Chip capacitor	BL	BL	BL	BL	BL	NA
48	Chip audion	BL	BL	BL	BL	BL	NA
49	Silvery metal screw	BL	BL	BL	BL	BL	NA

**Remark:**

- (1) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-VIS (for Cr<sup>6+</sup>) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1: 2013 (unit: mg/kg)

Element	Polymer	Metal	Composite Materials
Cd	$BL \leq (70-3\sigma) < IN < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < IN < (130+3\sigma) \leq OL$	$LOD < IN < (150+3\sigma) \leq OL$
Pb	$BL \leq (700-3\sigma) < IN < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < IN < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < IN < (1500+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < IN < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < IN < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < IN < (1500+3\sigma) \leq OL$
Cr	$BL \leq (700-3\sigma) < IN$	$BL \leq (700-3\sigma) < IN$	$BL \leq (500-3\sigma) < IN$
Br	$BL \leq (300-3\sigma) < IN$	--	$BL \leq (250-3\sigma) < IN$

BL= Below Limit      OL= Over Limit      LOD = Limit of Detection      -- = Not Regulated

- (2) "IN" expresses the inconclusive region, and further chemical testing to confirm whether it complies with the requirement of RoHS Directive.
- (3) The XRF screening test for RoHS elements – the reading may be different to the actual content in the sample be of non-uniformity composition.
- (4) mg / kg =milligram per kilogram=ppm,  $\mu\text{g}/\text{cm}^2$  = Micrograms per square centimetre.
- (5) ND = Not Detected or lower than limit of quantitation.



- (6) NA = Not Applicable, as the XRF screening test result was below the limit or as the XRF screening directly determine that test result was over the limit, it was not need to conduct the wet chemical testing.
- (7) LOQ = Limit of quantitation.

Test Items	Pb	Cd	Hg	Cr <sup>6+</sup>		PBB	PBDE
Units	mg/kg	mg/kg	mg/kg	mg/kg	µg/cm <sup>2</sup>	mg/kg	mg/kg
LOQ	2	2	2	8	0.1	5	5

The LOQ for single compound of PBBs and PBDEs is 5mg/kg, LOQ of Cr<sup>6+</sup> for polymer and composite sample is 8mg/kg and LOQ of Cr<sup>6+</sup> for metal sample is 0.1µg/cm<sup>2</sup>.

- (8) RoHS Requirement

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr <sup>6+</sup> )	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)

- (9) According to IEC 62321-7-1:2015, determined of Cr<sup>6+</sup> on metal sample by boiling water extraction test method, and result is shown as Positive/Negative.

Boiling water extraction:

Negative = Absence of Cr<sup>6+</sup> coating, the detected concentration in boiling water extraction solution is less than 0.10ug/cm<sup>2</sup>.

Positive = Presence of Cr<sup>6+</sup> coating, the detected concentration in boiling water extraction solution is greater than 0.13ug/cm<sup>2</sup>.

Information on storage conditions and production date of the tested sample is unavailable and thus Cr<sup>6+</sup> results represent status of the sample at the time of testing.

- (10) Abbreviation:

“Pb” denotes Lead, “Cd” denotes Cadmium, “Hg” denotes Mercury, “Cr” denotes Chromium, “Cr (VI)” denotes Hexavalent Chromium, “Br” denotes Bromine, “PBBs” denotes Total Polybrominated Biphenyls, “PBDEs” denotes Total Polybrominated Diphenyl Ethers.

- (11) \* = According to the declaration from client, the source of lead in test sample is from the glass or ceramic material of that electronic component which is exempted by Directive 2011/65/EU.



## 2. Phthalates:

Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	1+2+5+7+9 <sup>△</sup>	<50	<50	98	<50
T02	8+16+18+26+31 <sup>△</sup>	<50	<50	<50	<50
T03	13	<50	<50	<50	<50
T04	14	<50	<50	<50	<50
T05	15	<50	<50	<50	<50
T06	19	<50	<50	<50	<50
T07	21	<50	<50	<50	<50
T08	24	<50	<50	<50	<50
T09	25	<50	<50	<50	<50
T10	29	<50	<50	<50	<50
T11	30	<50	<50	<50	<50
T12	32	<50	<50	<50	<50
T13	33	<50	<50	<50	<50
T14	34+38+39+40+41 <sup>△</sup>	<50	<50	<50	<50
T15	35	<50	<50	<50	<50
T16	42+43+44+46+47 <sup>△</sup>	<50	<50	<50	<50
T17	48	<50	<50	<50	<50

### Note:

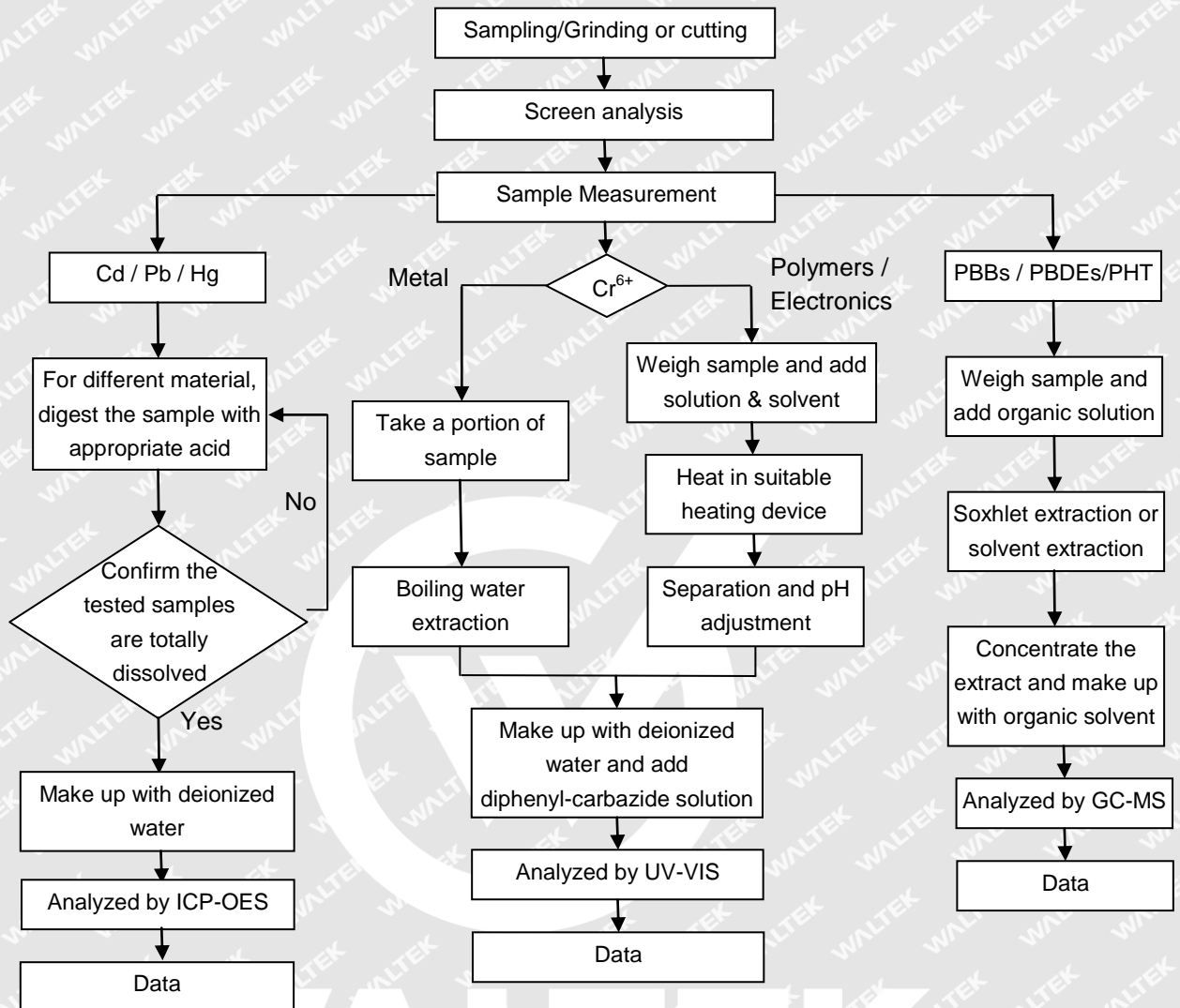
- (1) "<" = less than
- (2) mg/kg = milligram per kilogram= ppm
- (3) Abbreviation:  
"DBP" denotes Dibutyl phthalate, "BBP" denotes Benzyl butyl phthalate (BBP), "DEHP" denotes Bis(2-ethylhexyl)-phthalate, "DIBP" denotes Diisobutyl phthalate, "PHT" denotes Phthalates.
- (4) RoHS requirement

Restricted Substances	Limits
Dibutyl phthalate (DBP)	0.1% (1000 mg/kg)
Benzyl butyl phthalate (BBP)	0.1% (1000 mg/kg)
Di(2-ethylhexyl) phthalate (DEHP)	0.1% (1000 mg/kg)
Di-iso-butyl phthalate (DIBP)	0.1% (1000 mg/kg)

- (5) "△" = As client's requirement, the testing was conducted based on mixed components. Results are calculated by the minimum weight of mixed components.



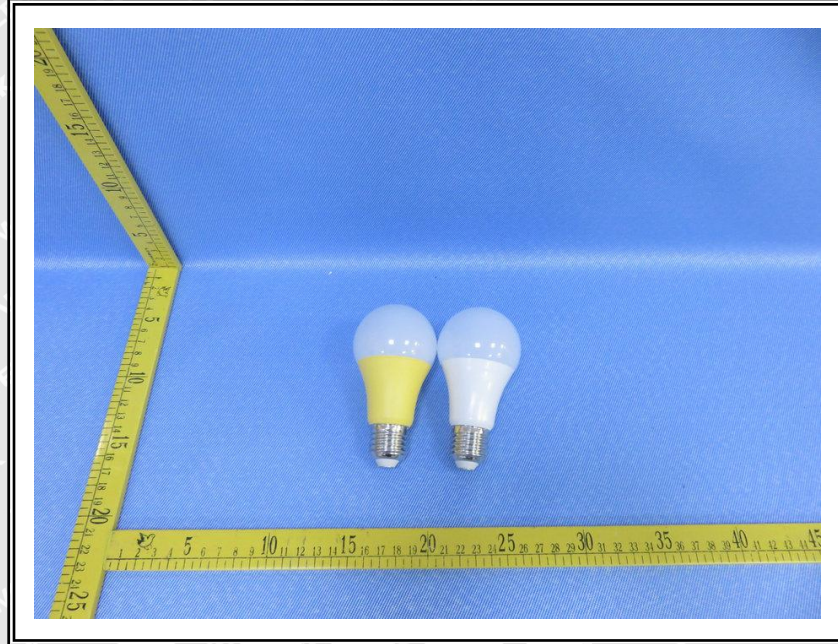
**Measurement Flowchart:**







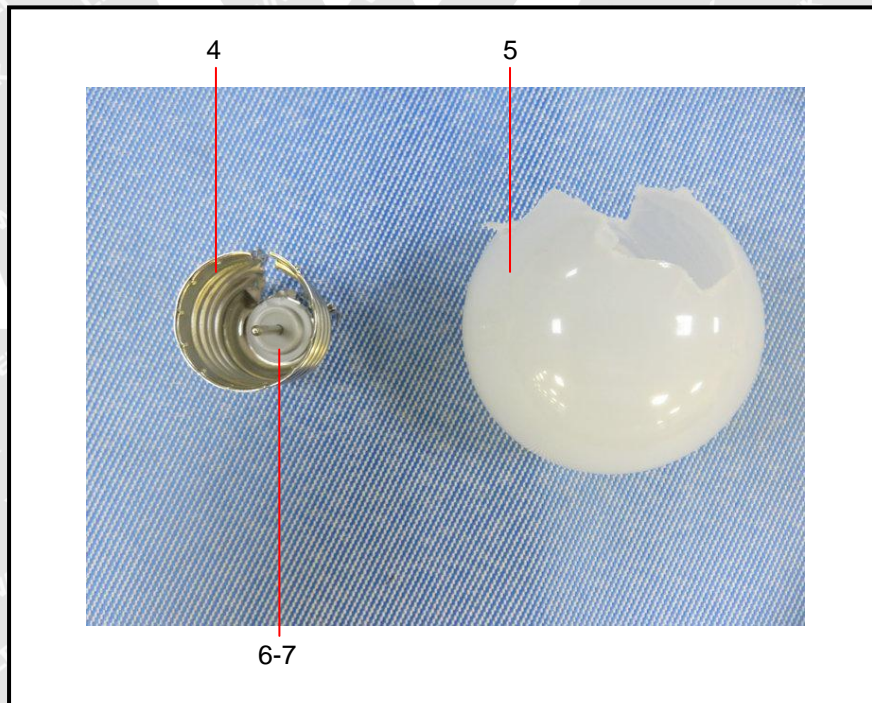
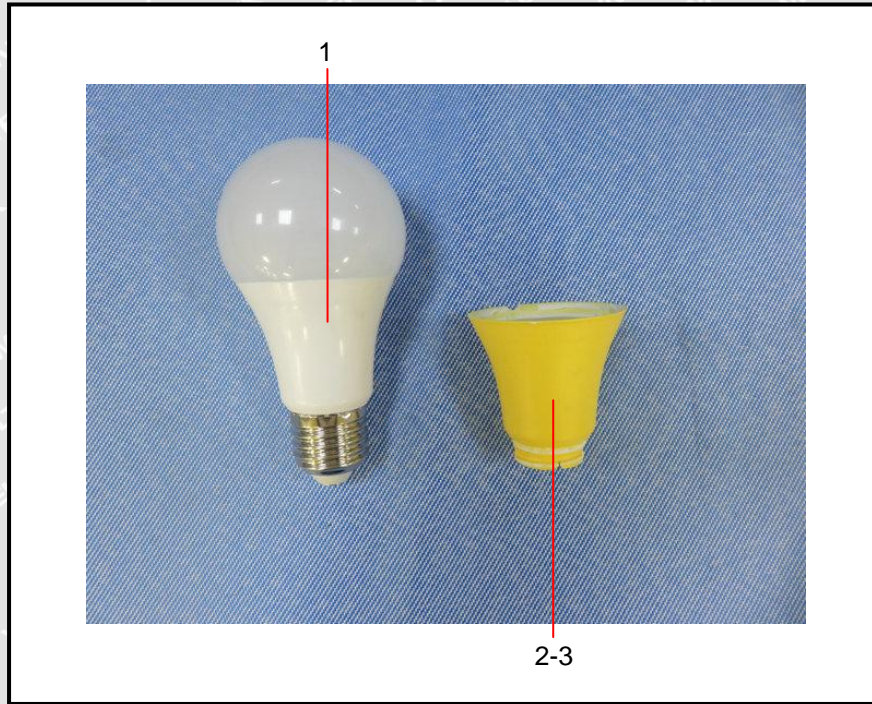
**Sample Photo(s):**

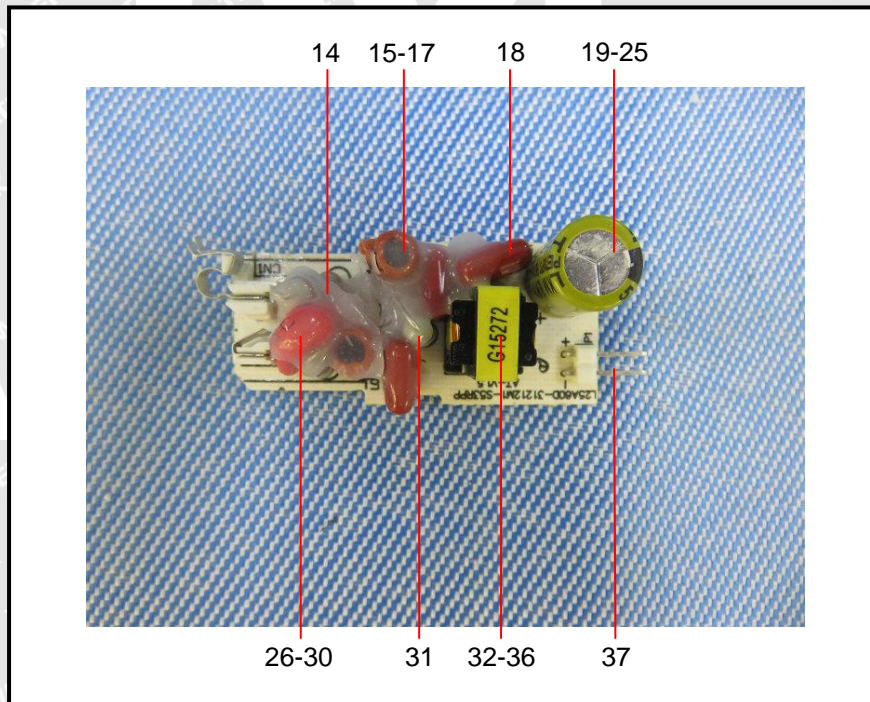
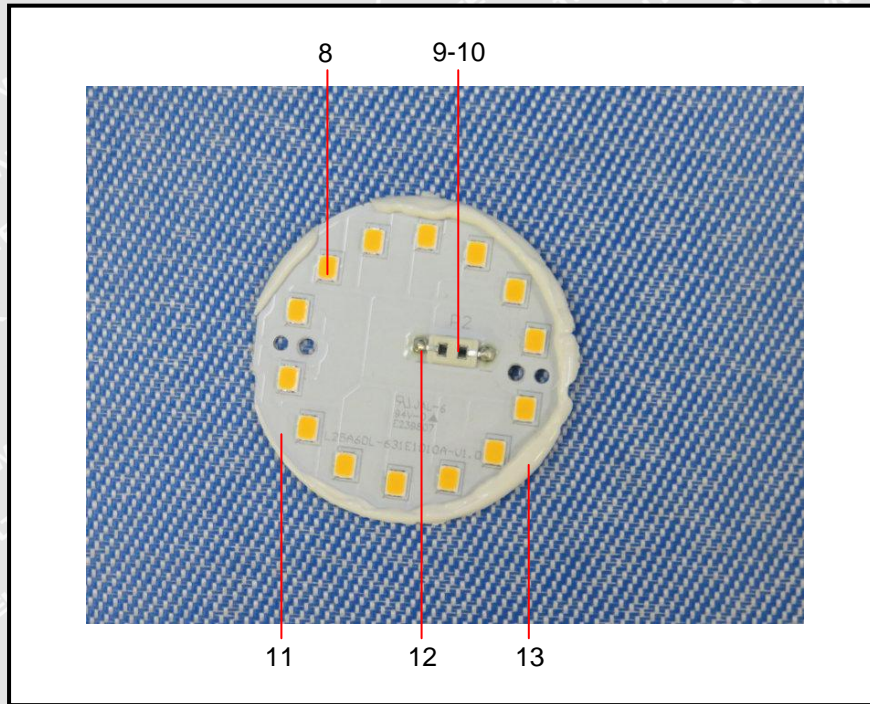


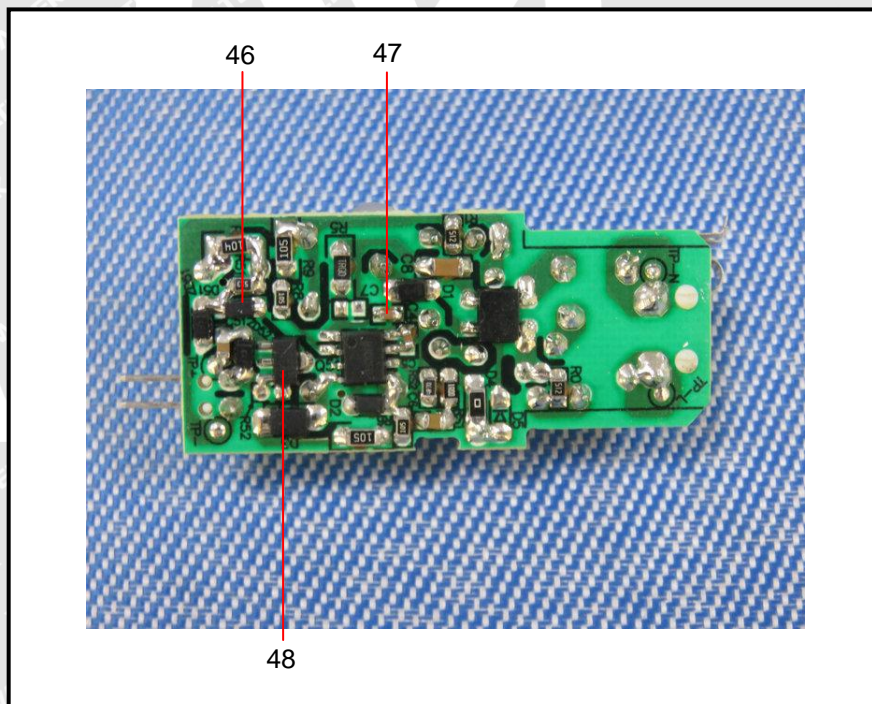
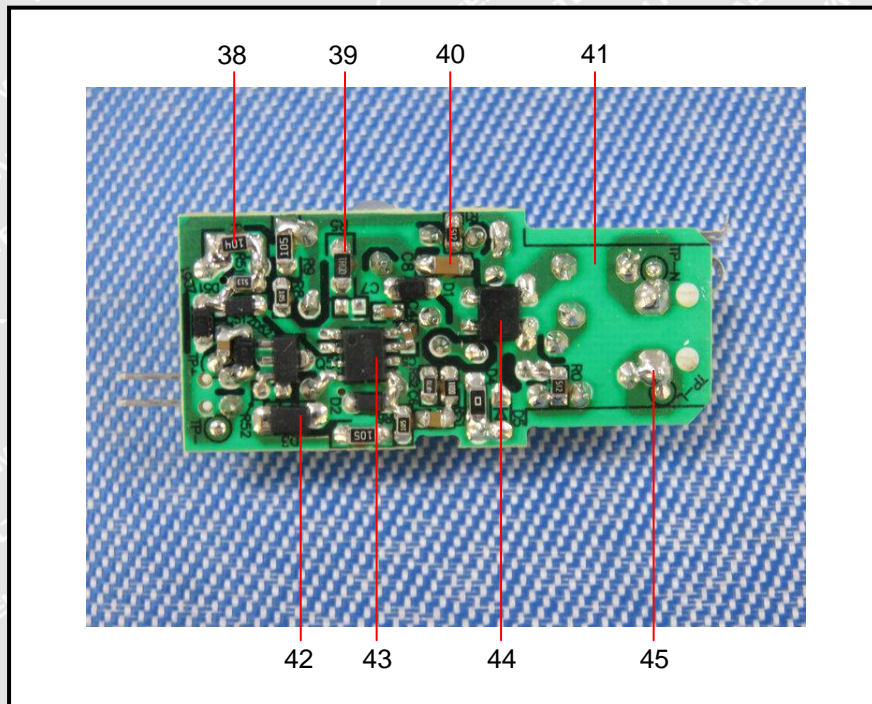
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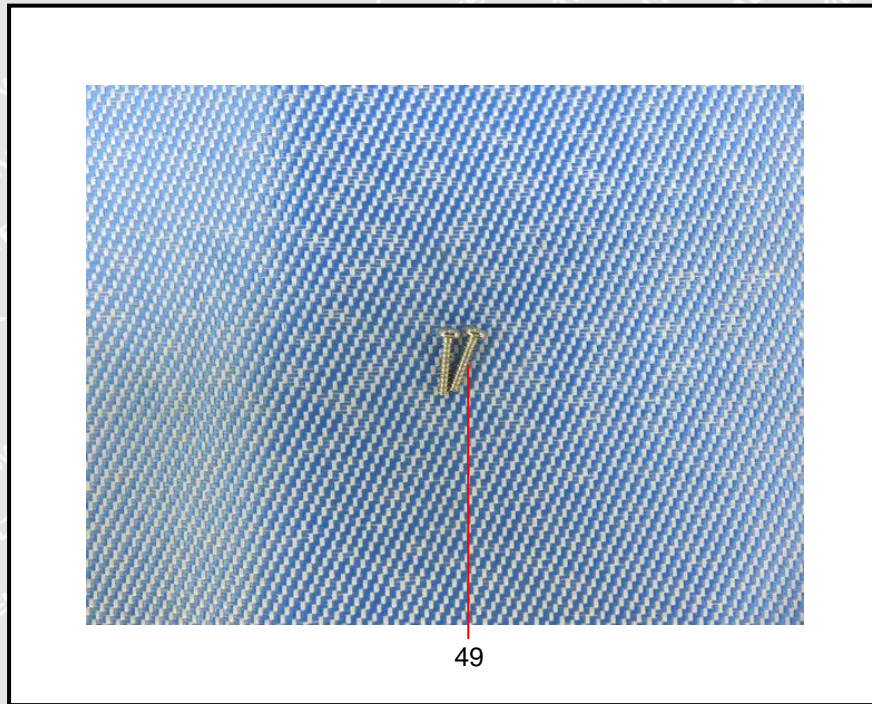


**Photograph(s) of parts tested:**









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==== End of Report ====

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