TEST REPORT

Report No.	:	WTF22F01004053A1C
Applicant	:	
Address	:	
Manufacturer	:	
Address	:	
Sample Name	:	LINE LIGHTING
Model No.	:	SAUSAGE5FT24W4000K
Reference Model No.	:	SAUSAGE4FT21W4000K, SAUSAGE2FT15W4000K, TUNNEL-5FT25W4200K, TUNNEL-4FT22W4200K, TUNNEL-2FT15W4200K
Sample Receiving Date	:	2022-01-21 & 2022-03-02
Testing Period	:	2022-01-21 to 2022-02-10 & 2022-03-02 to 2022-03-08
Date of Issue	:	2022-04-28
Test Result	:	Please refer to next page (s)

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.
If the report is not stamped with the accreditation recognized seal, it will only be used for scientific research, education, and internal quality control activities, and is not used for the purpose of issuing supporting data to the society.

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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** (As per client's requirement, to test the specified components. The results of specified components comply with the requirement of EU RoHS Directive 2011/65/EU and its amendment (EU) No.2015/863.)

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	BL	BL	BL	BL	BL	NA
2	White plastic sleeve	BL	BL	BL	BL	BL	NA
3	Black soft plastic washer	BL	BL	BL	BL	BL	NA
4	White plastic nut	BL	BL	BL	BL	BL	NA
5	Black soft plastic sleeve	BL	BL	BL	BL	BL	NA
6	Semi-transparent plastic washer	BL	BL	BL	BL	BL	NA
7	Black plastic wire covering	BL	BL	BL	BL	BL	NA
8	Red plastic wire covering	BL	BL	BL	BL	BL	NA
9	Silvery metal wire	BL	BL	BL	BL	BL	NA
10	Chip LED	BL	BL	BL	BL	BL	NA
11	White glue	BL	BL	BL	BL	BL	NA
12	White fibrous adhesive tape	BL	BL	BL	BL	BL	NA
13	Solder	BL	BL	BL	BL	BL	NA
14	Silvery metal sheet without white coating	BL	BL	BL	BL	BL	NA
15	White coating	BL	BL	BL	BL	BL	NA
16	Semi-transparent plastic shell	BL	BL	BL	BL	BL	NA
17	Grey plastic shell of connector	BL	BL	BL	BL	BL	NA
18	Silvery metal sheet of connector	BL	BL	BL	IN	BL	Cr^{6+} : Negative
19	Black plastic shell of fuse	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	Black plastic core of fuse	BL	BL	BL	BL	BL	NA
21	Silvery metal pin of fuse	BL	BL	BL	BL	BL	NA
22	Silvery metal wire of fuse	BL	BL	BL	BL	BL	NA
23	White fibrous wire of fuse	BL	BL	BL	BL	BL	NA
24	Grey plastic shell of capacitor	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
25	Black epoxy resin of capacitor	BL	BL	BL	BL	BL	NA
26	Silvery metal foil of capacitor	BL	BL	BL	BL	BL	NA
27	Green plastic film of electrolytic capacitor	BL	BL	BL	BL	BL	NA
28	Silvery metal shell of electrolytic capacitor	BL	BL	BL	BL	BL	NA
29	Black rubber stopper of electrolytic capacitor	BL	BL	BL	BL	BL	NA
30	Brown paper of electrolytic capacitor	BL	BL	BL	BL	BL	NA
31	Slivery metal foil of electrolytic capacitor	BL	BL	BL	BL	BL	NA
32	Grey metal foil of electrolytic capacitor	BL	BL	BL	BL	BL	NA
34	Yellow plastic adhesive tape of transformer	BL	BL	BL	BL	BL	NA
35	Black plastic bobbin of transformer	BL	BL	BL	BL	BL	NA
36	Black magnetic core of transformer	BL	BL	BL	BL	BL	NA
37	Coppery metal winding of transformer	BL	BL	BL	BL	BL	NA
38	Black plastic base of inductor	BL	BL	BL	BL	BL	NA
39	Grey magnetic core with green coating of inductor	BL	BL	BL	BL	BL	NA
40	Coppery enamelled winding of inductor	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	
41	Coppery metal winding of inductor	BL	BL	BL	BL	BL	NA
42	Black heat-shrinkable tube of inductor	BL	BL	BL	BL	BL	NA
43	Black magnetic core of inductor	BL	BL	BL	BL	BL	NA
44	Coppery metal winding of inductor	BL	BL	BL	BL	BL	NA
45	Blue body of resistor	BL	BL	BL	BL	BL	NA
46	Solder	BL	BL	BL	BL	BL	NA
47	Chip resistor	BL	IN	BL	BL	BL	Pb : 384
48	Chip capacitor	BL	BL	BL	BL	BL	NA
49	Chip diode	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
50	Chip rectifier	BL	BL	BL	BL	BL	NA
51	Chip capacitor	BL	BL	BL	BL	BL	NA
52	Chip IC	BL	BL	BL	BL	BL	NA
53	Solder	BL	BL	BL	BL	BL	NA
54	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND

Remark:

(1) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-VIS (for Cr^{6+}) 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 ≤ (70-3σ) < IN < (130+3σ) ≤ OL	BL ≤ (70-3σ) < IN < (130+3σ) ≤ OL	LOD < IN < (150+3σ) ≤ OL
Pb	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < IN < (1500+3σ) ≤ OL
Hg	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < IN < (1500+3σ) ≤ OL
Cr	BL ≤ (700-3σ) < IN	BL ≤ (700-3σ) <IN	BL ≤ (500-3σ) < IN
Br	BL ≤ (300-3σ) < IN	--	BL ≤ (250-3σ) < 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, $\mu g/cm^2$= 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^{6+}		PBB	PBDE
Units	mg/kg	mg/kg	mg/kg	mg/kg	$\mu g/cm^2$	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^{6+} for polymer and composite sample is 8mg/kg and LOQ of Cr^{6+} for metal sample is 0.1$\mu g/cm^2$.

(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^{6+})	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^{6+} on metal sample by boiling water extraction test method, and result is shown as Positive/Negative.

Boiling water extraction:

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

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

Information on storage conditions and production date of the tested sample is unavailable and thus Cr^{6+} 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)As per client's requirement, to test the specified components. The test results relate only to the components tested, and it doesn't mean that the whole product complies with the RoHS Directive 2011/65/EU and its amendment (EU) No.2015/863.

2. Phthalates:

Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	1	<50	<50	<50	<50
T02	2	581	<50	424	333
T03	3	<50	<50	564	<50
T04	4	<50	<50	<50	<50
T05	5	<50	<50	<50	<50
T06	6	<50	<50	<50	<50
T07	7	<50	<50	<50	<50
T08	8	<50	<50	<50	<50
T09	10+36+45+47+48△	<50	<50	<50	<50
T10	11	<50	<50	<50	<50
T11	12	<50	<50	<50	<50
T12	15	<50	<50	<50	<50
T13	16	<50	<50	<50	<50
T14	17	<50	<50	<50	<50
T15	19+20+24+35△	<50	<50	<50	<50
T16	23+40+43+54△	<50	<50	<50	<50
T17	25+38△	<50	<50	<50	<50
T18	27	<50	<50	<50	<50
T19	29	<50	<50	<50	<50
T20	30	<50	<50	<50	<50
T21	34	<50	<50	89	<50
T22	39+49+50+51+52△	<50	<50	<50	<50
T23	42	<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.

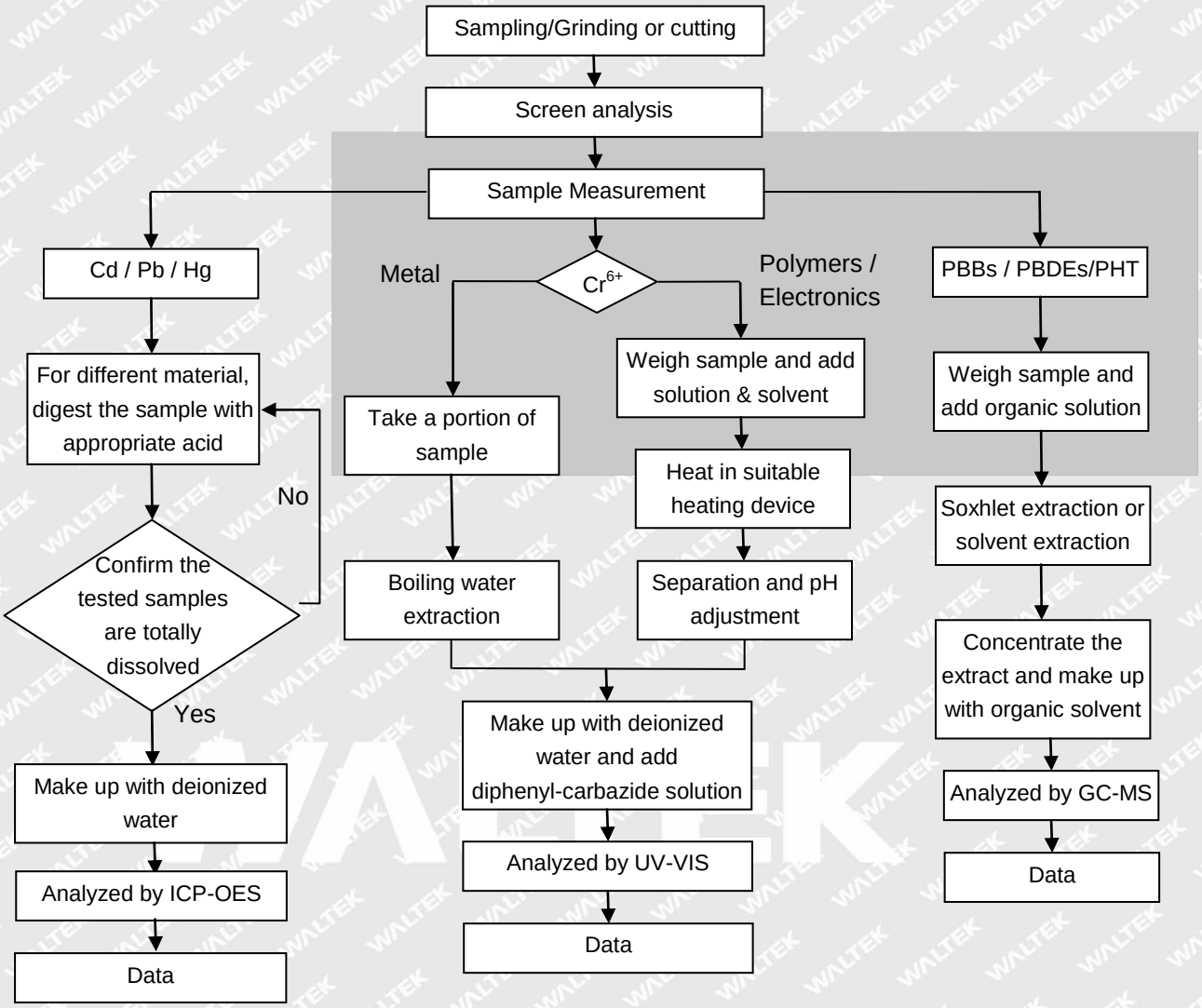
(4) RoHS requirement

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.

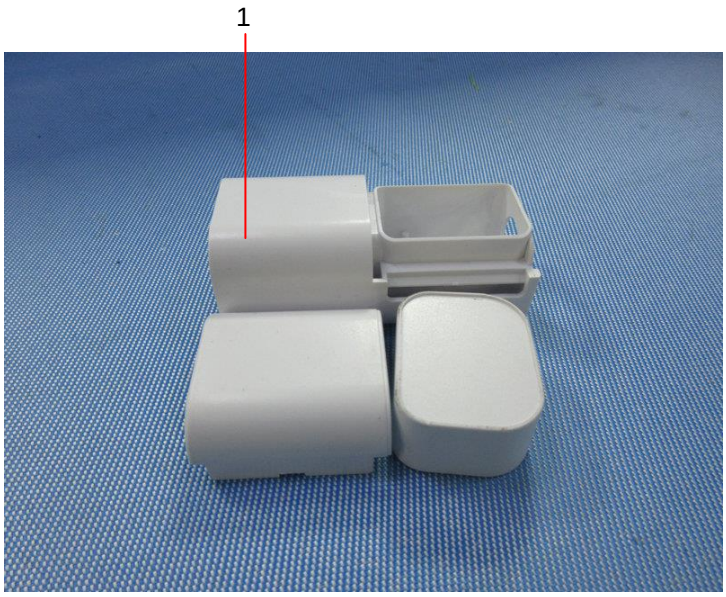
(6) As per client's requirement, to test the specified components. The test results relate only to the components tested, and it doesn't mean that the whole product complies with the RoHS Directive 2011/65/EU and its amendment (EU) No.2015/863.

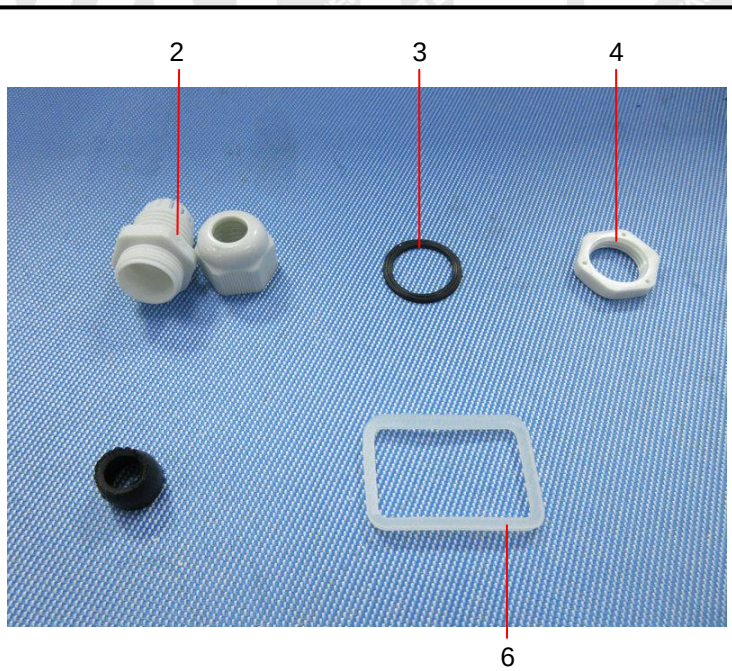
Measurement Flowchart:

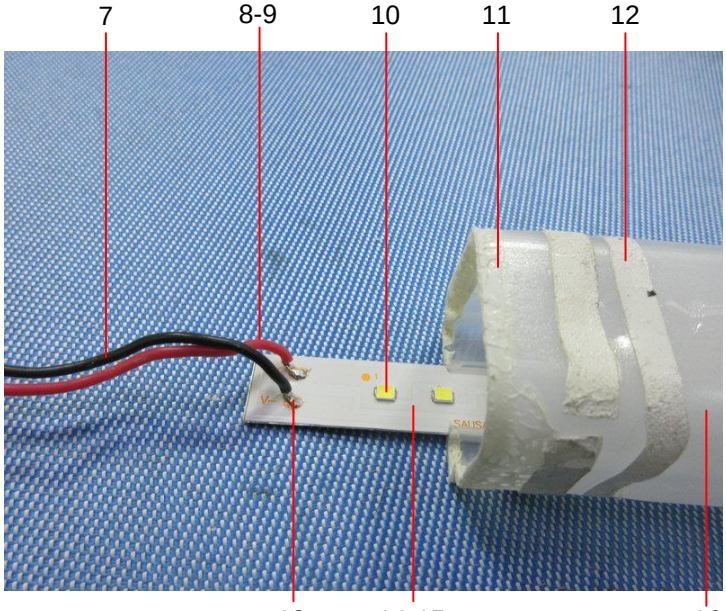


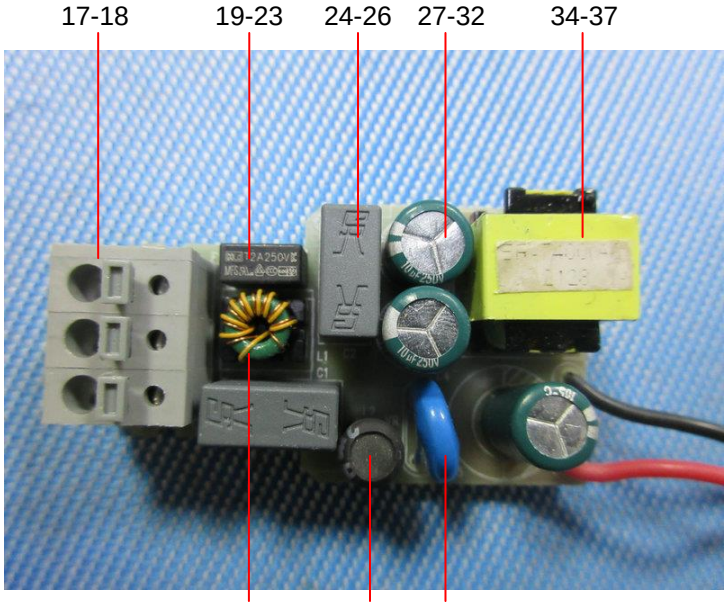
Sample Photo(s):

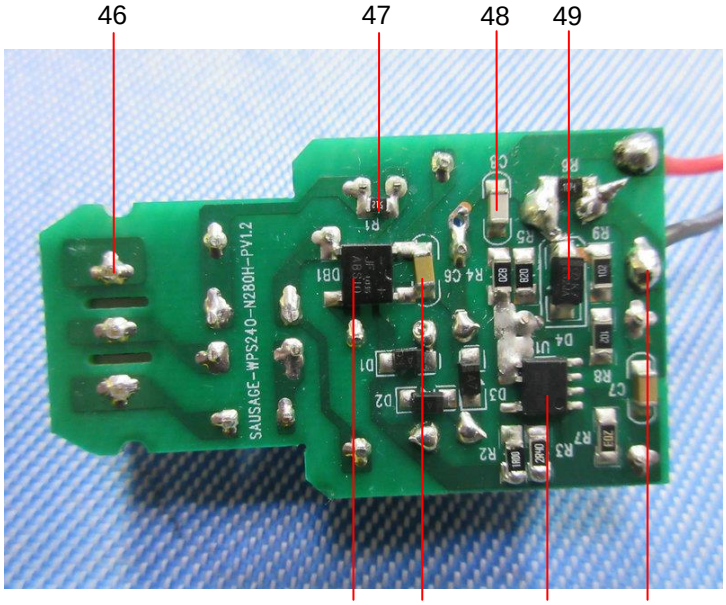
Photograph(s) of parts tested:

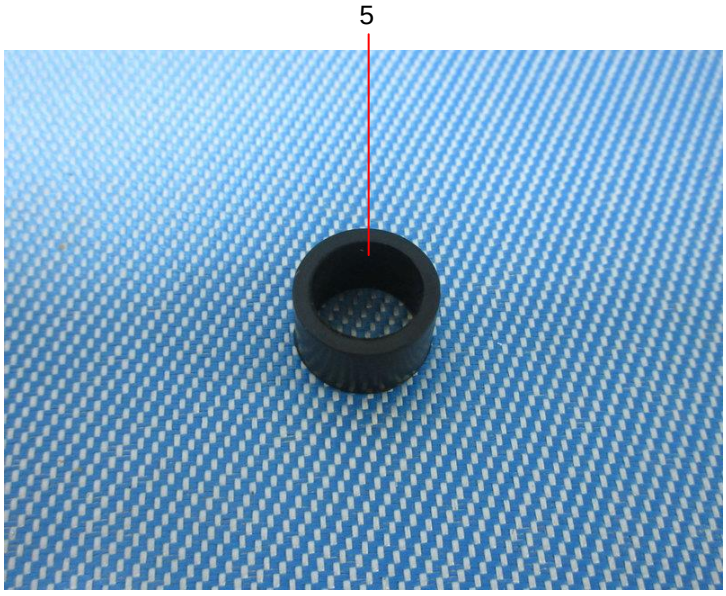












====== End of Report ======