Verification Report

CENTRE TESTING INTERNATIONAL

Applicant Lightstec Co.,Limited

Address 5F-6F,No.41 WANLE EAST ROAD,SHENGFENG,XIAOLAN TOWN,ZHONGSHAN ,CHINA

Product Name SMD LED STRIP LIGHT

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Conclusion:

Tested Sample	According to directive	Result
Tested Sample	2011/65/EU*	Pass

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*2011/65/EU is a new version of RoHS Directive (2002/95/EC), which focuses on restriction of the use of certain hazardous substances (Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs),Polybrominated Diphenyl Ethers(PBDEs))in electrical and electronic equipment.

Pass means that the results shown on the report do not exceed the limits set by RoHS Directive 2011/65/EU.

Tested by Rick Lin Reviewed by Vangan He

Approved by Date Aug. 11, 2015

Danny Liu

Technical Manager

No.R179751642

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Report Content

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The following sample(s) and sample information was/were submitted and identified by/on the behalf of the client

Product Part No.	LT-3528W60R-W12,LT-3528W120R-W12,LT-3528W240R-W12,LT-3528W60R-W24, LT-3528W120R-W24,LT-3528W240R-W24,LT-5050W30R-W12,LT-5050W60R-W12, LT-5050W120R-W12,LT-5050W30R-W24,LT-5050W60R-W24,LT-5050W120R-W24, LT-2835W60R-W12,LT-2835W120R-W12,LT-2835W192R-W12,LT-2835W60R-W24, LT-2835W120R-W24,LT-2835W192R-W24,LT-3014W60R-W12,LT-3014W120R-W12, LT-3014W60R-W24,LT-3014W120R-W24,LT-3014W238R-W24, LT-3014W240R-W24, LT-335W60R-W12,LT-335W120R-W12,LT-335W60R-W24,LT-335W120R-W24,LT-2216W300R-W24
Sample Received Date	Aug. 3, 2015
Testing Period	Aug. 3, 2015 to Aug. 11, 2015

Test Requested

1. As specified by client, to screen Lead(Pb), Cadmium(Cd), Mercury(Hg), Chromium(Cr) and Bromine(Br) in the submitted sample(s) by XRF.
2.As specified by client, when screening results exceed the XRF screening limit in IEC 62321-3-1:2013 Ed.1.0, further use of chemical methods are required to test the Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs) in the submitted samples.

Photo(s) of the Product(s)

SMD LED strip

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Test Result(s)

Sample No.	Sample Description	Tested Items	XRF Screening Test	Chemical Test (mg/kg)	Conclusion
1	Black/red plastic	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
2	Red plastic with black printing	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
3	Cupreous metal	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	/	/	
4	White plastic with deep gray printing	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
5	FPC (Tested as a whole)	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
6	Silvery metal	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	/	/	

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Test Result(s)

Sample No.	Sample Description	Tested Items	XRF Screening Test	Chemical Test (mg/kg)	Conclusion
7	LED (Tested as a whole)	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
8	Gray-white paper with gray printing	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
9	Semi-transparent glue	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
10	Brown capacitance (Tested as a whole)	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
11	Black resistor (Tested as a whole)	Pb	OL	876	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
12	Black resistor (Tested as a whole)	Pb	X	185	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	

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Test Result(s)

Sample No.	Sample Description	Tested Items	XRF Screening Test	Chemical Test (mg/kg)	Conclusion
13	Black IC (Tested as a whole)	Pb	BL	/	PASS
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(Ⅵ))	BL	/	
		Br(PBBs&PBDEs)	BL	/	

Remark: -BL = Under the XRF screening limit
-OL = Further chemical test will be conducted while the result is above the screening limit.
-X= The symbol "X" marks the region where further investigation is necessary.
-Negative = Absence of Cr(VI) , the detected Cr(VI) concentration in the boiling water extraction solution is less than 0.02 mg/kg with 50cm^2 sample surface area used.

Note: **1.The screening results are only used for reference.**
2.When conducting the test for PBBs&PBDEs, XRF was introduced to screen Br Exclusively; When conducting the test for Hexavalent Chromium, XRF was introduced to screen Chromium exclusively.

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Test Method

A.Screening test by XRF spectroscopy

XRF screening limits in mg/kg for regulated elements according to IEC 62321-3-1:2013 Ed.1.0

Element	Limit of IEC 62321-3-1:2013 Ed.1.0 (unit:mg/kg)		MDL	
	Polymers and metals	Composite material	Polymers	Other material
Pb	BL≤(700-3σ) <X <(1300+3σ) ≤OL	BL≤(500-3σ)<X <(1500+3σ) ≤OL	10 mg/kg	50 mg/kg
Cd	BL≤(70-3σ)<X <(130+3σ) ≤OL	LOD≤(50-3σ)<X <(150+3σ) ≤OL	10 mg/kg	50 mg/kg
Hg	BL≤(700-3σ)<X <(1300+3σ) ≤OL	BL≤(500-3σ)<X <(1500+3σ) ≤OL	10 mg/kg	50 mg/kg
Cr	BL≤(700-3σ)< X	BL≤(500-3σ)< X	10 mg/kg	50 mg/kg
Br	BL≤(300-3σ)< X	BL≤(250-3σ)< X	10 mg/kg	50 mg/kg

Remark: -BL = Under the XRF screening limit

-OL = Further chemical test will be conducted while result is above the screening limit.

-X= The symbol "X" marks the region where further investigation is necessary.

-3σ= The reproducibility of analytical instruments

-LOD= Detection limit

B.Chemical Test

Tested Item(s)	Test Method	Measured Equipment(s)	MDL
Lead (Pb)	IEC 62321-5:2013 Ed.1.0	ICP-OES	2 mg/kg
	Refer to IEC 62321-5:2013 Ed.1.0	ICP-OES	2 mg/kg
Cadmium (Cd)	IEC 62321-5:2013 Ed.1.0	ICP-OES	2 mg/kg
	Refer to IEC 62321-5:2013 Ed.1.0	ICP-OES	2 mg/kg
Mercury (Hg)	IEC 62321-4:2013 Ed.1.0	ICP-OES	2 mg/kg
	Refer to IEC 62321-4:2013 Ed.1.0	ICP-OES	2 mg/kg
Hexavalent Chromium Cr(Ⅵ)	IEC 62321:2008 Ed.1	UV-Vis	/
	IEC 62321:2008 Ed.1	UV-Vis	2 mg/kg
Polybrominated Biphenyls (PBBs)	IEC 62321:2008 Ed.1	GC-MS	5 mg/kg
Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321:2008 Ed.1	GC-MS	5 mg/kg

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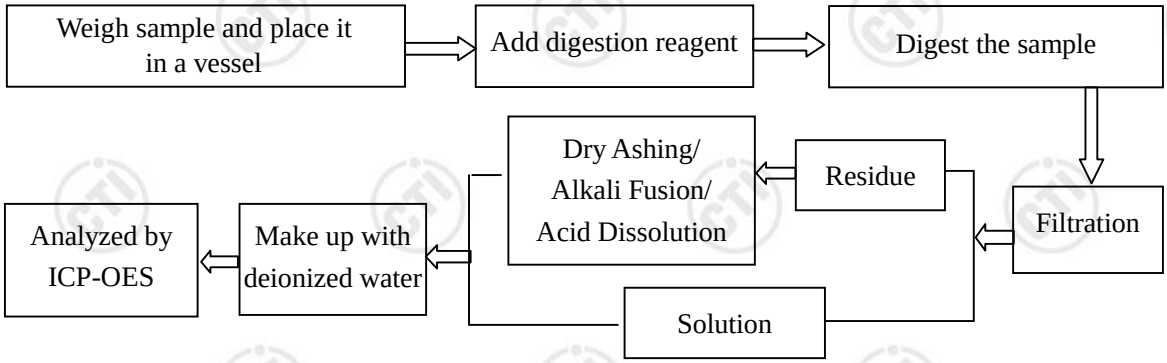
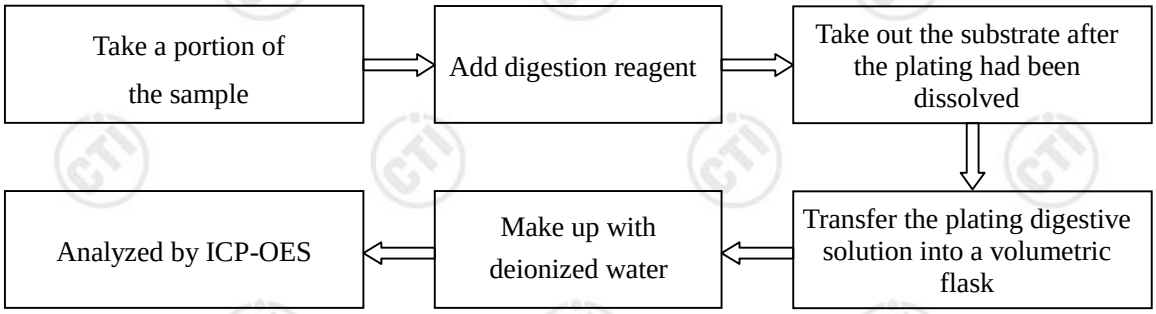
Test Process

1).Test for Pb/Cd Content

Non-plating samples

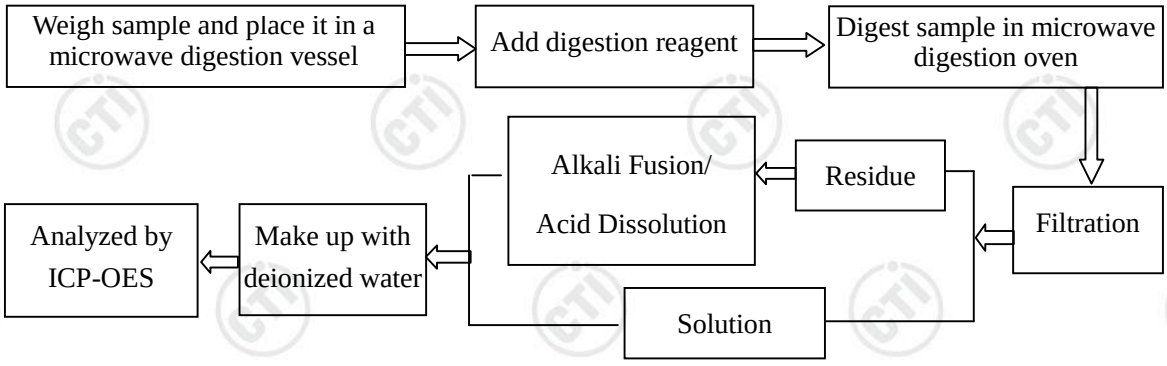


Plating samples

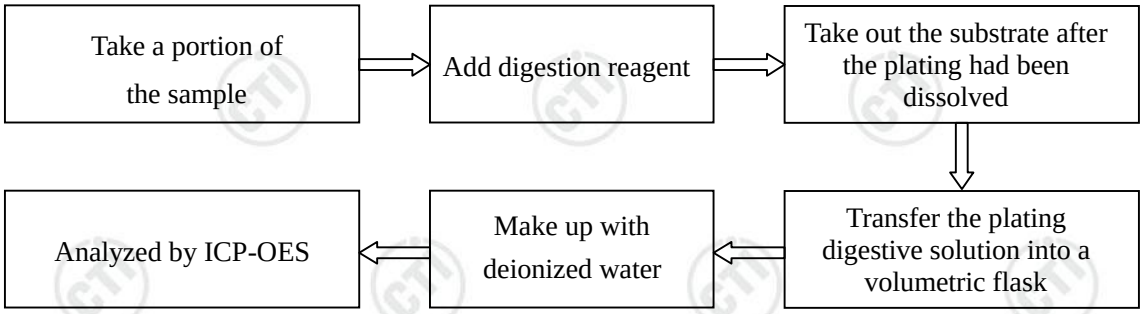


2).Test for Hg Content

Non-plating samples

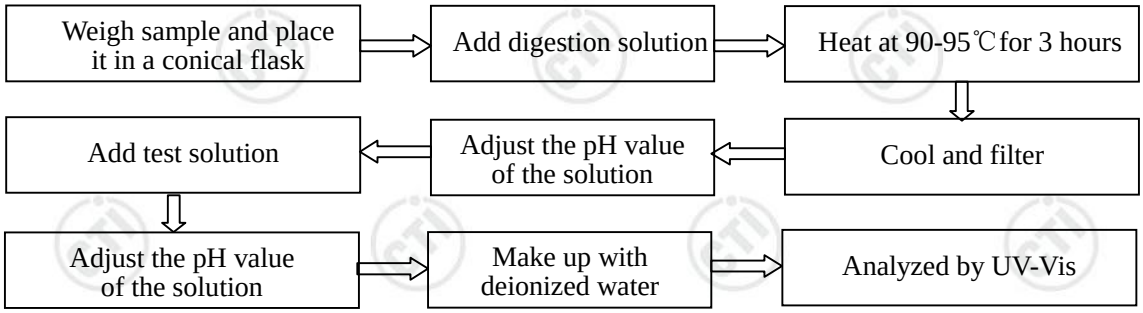


Plating samples

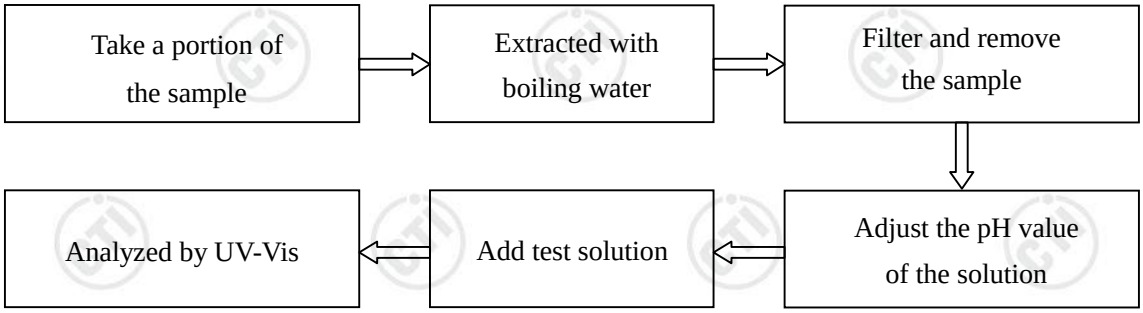


3).Test for Chromium(Ⅵ) Content

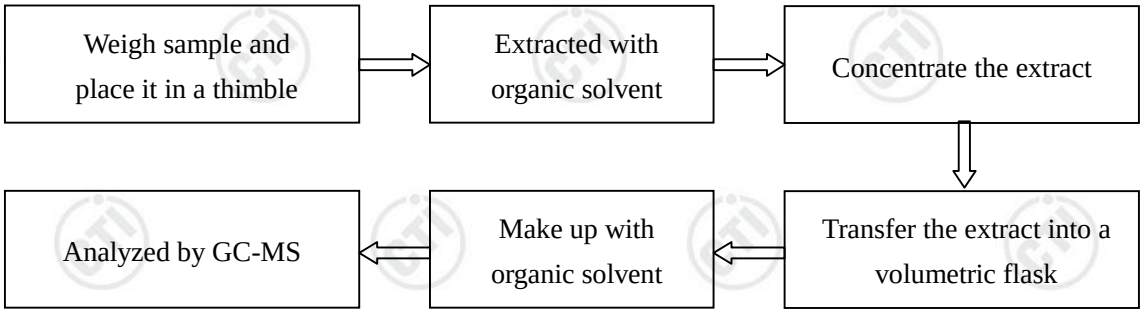
Non-metal samples



Plating/Metal samples



4).Test for PBBs/PBDEs Content



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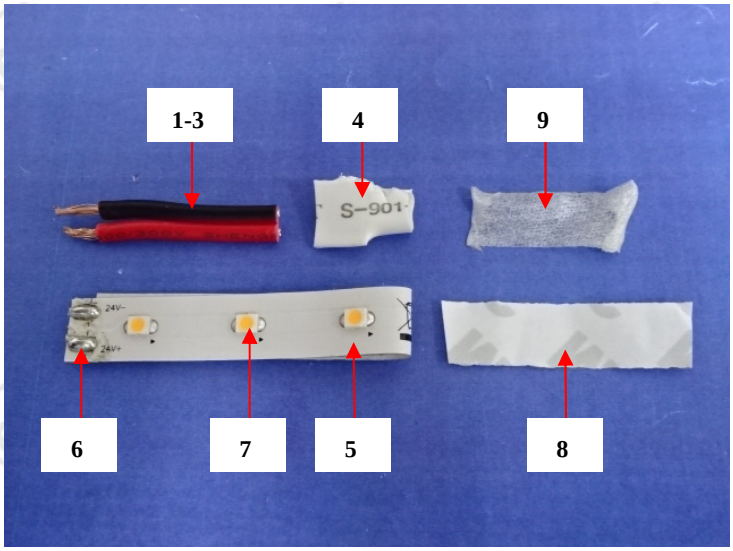
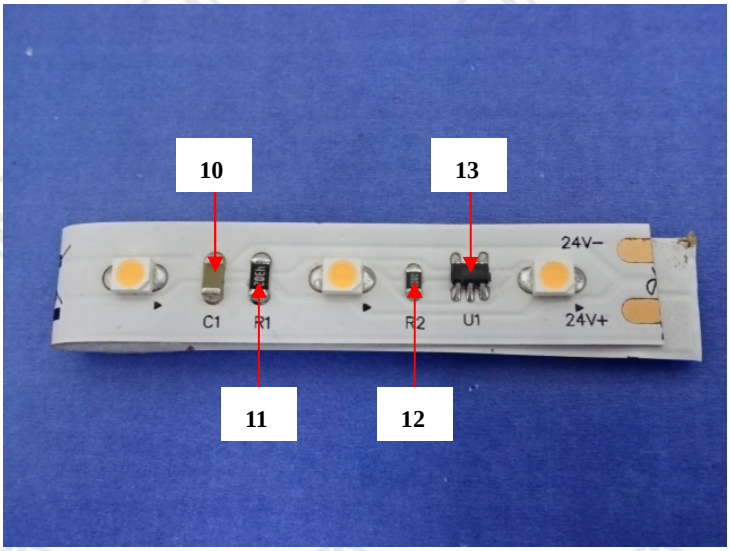
Photo(s) of the tested component(s)





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Exempted Items of RoHS Directive

In accordance with Directive 2011/65/EU as amended , there are 41 exemption items in Annex III of 2011/65/EU altogether.

	Exemption	Scope and dates of applicability
1	Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):	
1(a)	For general lighting purposes < 30 W: 5 mg	Expires on 31 December 2011; 3,5 mg may be used per burner after 31 December 2011 until 31 December 2012; 2,5 mg shall be used per burner after 31 December 2012.
1(b)	For general lighting purposes ≥ 30 W and < 50 W: 5 mg	Expires on 31 December 2011; 3,5 mg may be used per burner after 31 December 2011.
1(c)	For general lighting purposes ≥ 50 W and < 150 W: 5 mg	
1(d)	For general lighting purposes ≥ 150 W: 15 mg	
1(e)	For general lighting purposes with circular or square structural shape and tube diameter ≤17 mm	No limitation of use until 31 December 2011; 7 mg may be used per burner after 31 December 2011.
1(f)	For special purposes: 5 mg	
1(g)	For general lighting purposes < 30 W with a lifetime equal or above 20 000 h: 3,5 mg	Expires on 31 December 2017.
2(a)	Mercury in double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp):	
2(a)(1)	Tri-band phosphor with normal lifetime and a tube diameter < 9 mm (e.g. T2): 5 mg	Expires on 31 December 2011; 4 mg may be used per lamp after 31 December 2011.
2(a)(2)	Tri-band phosphor with normal lifetime and a tube diameter ≥ 9 mm and ≤ 17 mm (e.g. T5): 5 mg	Expires on 31 December 2011; 3 mg may be used per lamp after 31 December 2011.
2(a)(3)	Tri-band phosphor with normal lifetime and a tube diameter > 17 mm and ≤ 28 mm (e.g. T8): 5 mg	Expires on 31 December 2011; 3,5 mg may be used per lamp after 31 December 2011.
2(a)(4)	Tri-band phosphor with normal lifetime and a tube diameter > 28 mm (e.g. T12): 5 mg	Expires on 31 December 2012; 3,5 mg may be used per lamp after 31 December 2012.
2(a)(5)	Tri-band phosphor with long lifetime (≥ 25 000 h): 8 mg	Expires on 31 December 2011; 5 mg may be used per lamp after 31 December 2011.
2(b)	Mercury in other fluorescent lamps not exceeding (per lamp):	
2(b)(1)	Linear halophosphate lamps with tube > 28 mm (e.g. T10 and T12): 10 mg	Expires on 13 April 2012.
2(b)(2)	Non-linear halophosphate lamps (all	Expires on 13 April 2016.

	diameters): 15 mg	
2(b)(3)	Non-linear tri-band phosphor lamps with tube diameter > 17 mm (e.g. T9)	No limitation of use until 31 December 2011; 15 mg may be used per lamp after 31 December 2011.
2(b)(4)	Lamps for other general lighting and special purposes (e.g. induction lamps).	No limitation of use until 31 December 2011; 15 mg may be used per lamp after 31 December 2011.
3	Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp):	
3(a)	Short length (≤500 mm)	No limitation of use until 31 December 2011; 3,5 mg may be used per lamp after 31 December 2011.
3(b)	Medium length (> 500 mm and ≤ 1 500 mm)	No limitation of use until 31 December 2011; 5 mg may be used per lamp after 31 December 2011.
3(c)	Long length (> 1500 mm)	No limitation of use until 31 December 2011; 13 mg may be used per lamp after 31 December 2011.
4(a)	Mercury in other low pressure discharge lamps (per lamp).	No limitation of use until 31 December 2011; 15 mg may be used per lamp after 31 December 2011.
4(b)	Mercury in High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index Ra > 60:	
4(b)-I	P ≤ 155 W	No limitation of use until 31 December 2011; 30 mg may be used per burner after 31 December 2011.
4(b)-II	155 W < P≤405 W	No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011.
4(b)-III	P > 405 W	No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011.
4(c)	Mercury in other High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner):	
4(c)-I	P ≤ 155 W	No limitation of use until 31 December 2011; 25 mg may be used per burner after 31 December 2011.
4(c)-II	155 W < P ≤ 405 W	No limitation of use until 31 December

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		2011; 30 mg may be used per burner after 31 December 2011.
4(c)-III	P > 405 W	No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011.
4(d)	Mercury in High Pressure Mercury (vapour) lamps (HPMV).	Expires on 13 April 2015.
4(e)	Mercury in metal halide lamps (MH)	
4(f)	Mercury in other discharge lamps for special purposes not specifically mentioned in this Annex.	
4(g)	Mercury in hand crafted luminous discharge tubes used for signs, decorative or architectural and specialist lighting and light-artwork, where the mercury content shall be limited as follows: (a) 20 mg per electrode pair + 0,3 mg per tube length in cm ,but not more than 80 mg, for outdoor applications and indoor applications exposed to temperatures below 20°C; (b) 15 mg per electrode pair + 0,24 mg per tube length in cm, but not more than 80 mg, for all other indoor applications.	Expires on 31 December 2018.
5(a)	Lead in glass of cathode ray tubes.	
5(b)	Lead in glass of fluorescent tubes not exceeding 0,2 % by weight.	
6(a)	Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0,35 % lead by weight.	
6(b)	Lead as an alloying element in aluminium containing up to 0,4 % lead by weight.	
6(c)	Copper alloy containing up to 4% lead by weight.	
7(a)	Lead in high melting temperature type solders (i.e. lead- based alloys containing 85 % by weight or more lead).	
7(b)	Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission, and network management for telecommunications.	
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(c)-II	Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher.	
7(c)-III	Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC.	Expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013.
7(c)-IV	Lead in PZT based dielectric ceramic materials for capacitors being part of integrated circuits or discrete semiconductors.	
8(a)	Cadmium and its compounds in one shot pellet type thermal cut-offs.	Expires on 1 January 2012 and after that date may be used in spare parts for EEE placed on the market before 1 January 2012.
8(b)	Cadmium and its compounds in electrical contacts.	
9	Hexavalent chromium as an anticorrosion agent of the carbon steel cooling system in absorption refrigerators up to 0,75 % by weight in the cooling solution.	
9(b)	Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) applications.	
11(a)	Lead used in C-press compliant pin connector systems.	May be used in spare parts for EEE placed on the market before 24 September 2010.
11(b)	Lead used in other than C-press compliant pin connector systems.	Expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013.
12	Lead as a coating material for the thermal conduction module C-ring.	May be used in spare parts for EEE placed on the market before 24 September 2010.
13(a)	Lead in white glasses used for optical applications.	
13(b)	Cadmium and lead in filter glasses and glasses used for reflectance standards.	
14	Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80 % and less than 85 % by weight.	Expires on 1 January 2011 and after that date may be used in spare parts for EEE placed on the market before 1 January 2011.
15	Lead in solders to complete a viable electrical	

	connection between semiconductor die and carrier within integrated circuit flip chip packages.	
16	Lead in linear incandescent lamps with silicate coated tubes.	Expires on 1 September 2013.
17	Lead halide as radiant agent in high intensity discharge (HID) lamps used for professional reprography applications.	
18(a)	Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps when used as speciality lamps for diazoprinting reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS ($(Sr,Ba)_2MgSi_2O_7$:Pb).	Expires on 1 January 2011.
18(b)	Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP ($BaSi_2O_5$:Pb).	
19	Lead with PbBiSn-Hg and PbInSn-Hg in specific compositions as main amalgam and with PbSn-Hg as auxiliary amalgam in very compact energy saving lamps (ESL).	Expires on 1 June 2011.
20	Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCDs).	Expires on 1 June 2011.
21	Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses.	
23	Lead in finishes of fine pitch components other than connectors with a pitch of 0, 65 mm and less.	May be used in spare parts for EEE placed on the market before 24 September 2010.
24	Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors.	
25	Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring.	
26	Lead oxide in the glass envelope of black light blue lamps.	Expires on 1 June 2011.
27	Lead alloys as solder for transducers used in high-powered (designated to operate for	Expired on 24 September 2010.

	several hours at acoustic power levels of 125 dB SPL and above) loudspeakers.	
29	Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC.	
30	Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100 dB (A) and more.	
31	Lead in soldering materials in mercury free flat fluorescent lamps (which e.g. are used for liquid crystal displays, design or industrial lighting).	
32	Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes.	
33	Lead in solders for the soldering of thin copper wires of 100 μm diameter and less in power transformers.	
34	Lead in cermet-based trimmer potentiometer elements.	
36	Mercury used as a cathode sputtering inhibitor in DC plasma displays with a content up to 30 mg per display.	Expired on 1 July 2010.
37	Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body.	
38	Cadmium and cadmium oxide in thick film pastes used on aluminium bonded beryllium oxide.	
39	Cadmium in colour converting II-VI LEDs (< 10 μg Cd per mm 2 of light-emitting area) for use in solid state illumination or display systems.	Expires on 1 July 2014.
40	Cadmium in photoresistors for analogue optocouplers applied in professional audio equipment.	Expires on 31 December 2013.
41	Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted	Expires on 31 December 2018.

	directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council.	

*** End of Report ***