Maxwell Technologies, Inc.
3888 Calle Fortunada
San Diego, CA 92123

March 29th, 2017

RE: Large Cell Modules RoHS Declaration

To Our Valued Customers:

The EU Restriction on Hazardous Substances (RoHS) Directive (2011/65/EU) was recast from Directive 2002/95/EC on July 21, 2011, and member states are required to enforce the restrictions by January 2, 2013. It seeks to restrict the use of certain hazardous substances in electrical and electronic equipment by setting certain concentration limits for the following substances: lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium (Cr_{6+}), polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE).

Maxwell Technologies, Inc., along with its affiliates, vendors and partners, support the RoHS objective of preventing risks to human health and the environment, with a particular focus on workers involved in the management of electronic waste. Accordingly, Maxwell hereby declares that the products listed in Table 1 below do not contain any of the above mentioned substances in excess of the permitted concentrations.

Table 1

BMOD0500P016C01	BMOD0500P016B02	BMOD0500P016B01	BMOD0165P048B09	BMOD0083 P048 B01
BMOD0165P048B06	BMOD0165P048C01	BMOD0189P051B2A	BMOD0130 P056 B03	BMOD0165 P048 C0B
BMOD0165P054B0A				

The above statements are based upon one of the following techniques employed by Maxwell, its affiliates, vendors, or partners: certification at accredited test facilities; or through similarity in construction and materials used.

RoHS test reports prepared for Maxwell by an accredited facility are attached:

For additional questions or information, please contact your Maxwell Key Account Manager.

Maxwell Technologies, Inc.
Global Headquarters
3888 Calle Fortunada
San Diego, CA 92123
USA
Phone: +1 (858) 503-3300
Fax: +1 (858) 503-3301

Maxwell Technologies SA
Route de Montena 65
CH-1728 Rossens
Switzerland
Phone: +41 (0)26 411 85 00
Fax: +41 (0)26 411 85 05

Maxwell Technologies GmbH
Leopoldstrasse 244
80807 Münich
Germany
Phone: +49 (0)89 4161403 0
Fax: +49 (0)89 4161403 99

Maxwell Technologies Korea Co., Ltd
Room 1524, D-Cube City
Office Tower, 15F #662
Gyeongin-Ro, Guro-Gu,
Seoul, South Korea 152-706
Phone: +82 10 4518 9829

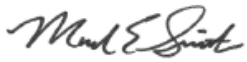
Maxwell Technologies (Shanghai) Trading Co., Ltd
Room 1005, 1006 and 1007
No. 1898, Gonghexin Road,
Jing An District, Shanghai 200072
P.R. China
Phone: +86 21 3680 4600
Fax: +86 21 3680 4699

Maxwell Technologies, Inc. Shanghai Representative Office
Rm 1008
No. 1898, Gonghexin Road,
Jing An District, Shanghai 200072
P.R. China
Phone: +86 21 3680 4600
Fax: +86 21 3680 4699

Test Report No.: 317G0752.001

Client:	Maxwell Technologies 9244 Balboa Ave. San Diego, CA 92123 USA
Test Item Description:	Large Cell Modules See material list
Model Identification:	BMOD0083 P048 B01 / BMOD0165 P048 BXX / BMOD0189 P051 B2A / BMOD0500 P016 B01 / BMOD0500 P016 B02 / BMOD0165 P048 C0B / BMOD0130 P056 B03 / BMOD0165 P048 C01
Delivery Condition:	*apparent good* **Dates of Receipt:** 02/04/2015, 02/25/2015, 03/18/2015, 09/08/2015, 10/5/2015, 02/26/2016, 08/30/2016, 10/31/2016, 03/08/2017
Testing Location:	TÜV Rheinland of North America 2709 SE Otis Corley Dr, Suite 11 Bentonville, AR 72712 USA
Test Specification:	Directive **2011/65/EU** on the restriction of the use of certain hazardous substances in electrical and electronic equipment **(RoHS)** Following the guidelines for Analysis IEC 62321
Test Result:	**The above described test object was tested and passed to the above-mentioned test specification.**

Tested by: **Checked by:**



Date	Name	Signature	Date	Name	Signature
3/28/2017	Cody Carson Laboratory Technician		3/28/2017	Mark Smith Laboratory Manager	

Other Aspects:

Test Method: **IEC 62321:2008**
Components were evaluated using one or more of the following methods:

XOS XRF Screening, Wet chemical analysis, or Manufacturer RoHS compliance mark/documentation.

1. Testing Date(s):

2/4/2015 - 3/28/2017

RoHS Requirements

Limts For RoHS Compliance (mg/kg)					
Cr VI	**Sum of PBB**	**Sum of PBDE**	**Cd**	**Hg**	**Pb**
1000 mg/kg	1000 mg/kg	1000 mg/kg	100 mg/kg	1000 mg/kg	1000 mg/kg

2. Test Results

Material List

Material Number	Item Description
1 – 2	SCREW, VENT PLUG, M5 X 0.8
3 – 4	CONNECTOR, PLUG, 4 SOCKET, LOCKING, PLASTIC
5	CONN, WEDGLCK, FOR 4 SOCKET PLUG
6	CABLE TIE, 4.0 IN LONG
7	O-RING, ID .75, WID .06, BUNA-N RUB
8 – 9	ALM RIVET,BUT HD,1/8 DIA X.212 LNG
10 – 11	TAG, ATTENTION MODULE
12	THREADLCKR,HITEMP,LOCTITE 272,50ml
13	MIG welding wire ER4043 Alu,.030"Dia,3lb spool, STRAP, CELL SHORTING
14	COVER,BOARD, STANDARD MODULE, 48V
15	THERMAL PAD, PCBA, 48V
16	SEALANT, CLEAR SILICONE RUBBER
17	EPOXY, FIXMASTER UNDERWATER REPAIR
18 – 19	SCREW,PFH,6-32X.50, SS, W/ NYL PTCH
20	INSULATOR, NOMEX, 48V PCBA
21	LABEL, TAMPER PROOF, 1/2" X 2"
22	SCREW, PPH, M3-0.5X10mm, NYLON
23	LABEL, PART/SERIAL/BIN NUMBER, MODULE
24	GROMMET, .47 OD .14 ID, NEOPRENE BLK
25	TUBING, HEAT SHRINK, 8mm ID, BLACK

Material Number	Item Description
26 – 27	Screw, PPH, M3-0.5X12mm with Yellow Nylon Patch
28	O-Ring 3/32 ID x 7/32 OD x 1/16 W. Class 2.90 durometer. Military Flourocarbon
29	ADHESIVE, CYANOACRYLATE, BLACK
30 – 31	PRODUCT INFORMATION, 16V AND 48V MODULES
32 – 33 (1)	Screw, Hex Cap M8-1.25x25, Grade 8.8 YL Zn Plating, Combo
34 – 35 (1)	Screw,Hex Cap M10-1.5x25, Grade 8.8 YL ZN Plating, Combo
36	BUSS BAR, 62.5mm, LASER WELD
37	ARD, POSITIVE TERMINAL, 48V
38	ARD, NEGATIVE TERMINAL, 48V
39	BUSS BAR, TERMINAL, 48V MTS
40 – 41	TERMINAL, M8, 48V MTS
	TERMINAL, M10, 48V MTS
42 – 43	THERMAL PAD, STD, 48V MODULE
	THERMAL PAD, TERMINAL, 48V MODULE
44	GASKET, ARD, 48V MODULE
45 – 56	PCBA, V2.0B 105C 48V, RoHS
57 – 58	LABEL, BMOD0165 P048 C01
59	SCREW,FL HD HEXALOBULAR, M5-0.8 THREADFORM, TRILOBULAR, 16mm LNG, C-1018 STEEL, ZINC PLATE
60 – 71	CABLE, BALANCING HARNESS, 48V MTS
72	TAPE, POLYIMIDE, 1.0 IN X 36 YD
73	Gasket, Sealing, 48V PCB
74	TUBING, FLEXIBLE, SLIT, 1/4 ID
75	TAPE,VINYL, .0085" THK, 3/4' WIDE
76 – 77	CHASSIS, WELDED, CORNER COLUMNS
78	STANDOFF, ROUND, M5
79	GASKET, LEFT, MODULE
80	GASKET, RIGHT, MODULE
81	GASKET, TOP AND BOTTOM, MODULE
82 – 83	COVER, TOP, MODULE
84	COVER, BOTTOM, MODULE
85	GASKET, STANDOFF, MODULE, M5
86	TAPE, POLYESTER, SILICONE ADHESIVE , 0.076mm THK, 12.5mm WIDE, RED
87 – 88	LABEL, MODULE, DuraBlue
89	SPACER, TOP, 48V
90	SPACER, BOTTOM, 48V

Material Number	Item Description
91 – 104 (2)	48V CMS 2.5Z PCBA
105 – 106 (2)	48V 2.5Z O-Ring & Cover
1a -- 17a	PCBA, CMS2.5-K, BL2.5V, AL2.95V
18a -- 19a	HOUSING, FAN, MODULE
20a -- 23a	HARNESS, THERMISTOR, MODULE
24a	O-RING, PCBA COVER, SHORE A30, EPDM, .103"
25a -- 26a	CONNECTOR, RECPT, 4 PIN, LOCKING, PLASTIC, BLACK
27a	SCREW, LOW PROFILE SOCKET HEAD, HEXALOBULAR, M4X12
28a	SCREW, PAN HEAD, HEXALOBULAR, M4 X 50
29a	SCREW, THREADFORMING, TRILOBULAR
30a	RIVET, BARBED, PLASTIC
31a	WASHER, 4.3mm ID, 9mm OD, 0.8mm THK ZINC PLATE STEEL DIN125
32a	PLUG, SEALING, SIZE 20 CONTACT, DTM CONNECTOR
33a	CONN, WEDGELCK, FOR 4 PIN RECPT
34a	CONNECTOR, RECPT, 4 PIN, LOCKING, PLASTIC
35a -- 65a	FAN, 120mm
66a -- 78a (4)	16V Module PCBA
1b -- 11b (5)	CABLE, BALANCING HARNESS, 3V CELL ZION
12b -- 16b (5)	THERMISTOR Harness, 3V CELL ZION
17b (5)	FOAM PAD, PORON, ADHESIVE BACKED, 30x40
18b -- 30b (5)	PCBA, CMS2.6-Z, 48V, 16 CELLS BAL 2.65V, OV AL 3.1V
1c -- 12c (6)	PCBA, CMS 2.6
13c -- 15c (6)	THERMISTOR HARNESS
16c (6)	HEAT SHRINK
17c (6)	INSULATOR, BOTTOM COVER
18c (6)	INSULATOR, TOP COVER
19c (6)	POLYESTER TAPE
1d – 19d, 43d (7)	PCBA, CMS2.8X, 48V, 18 CELLS BAL2.3V, AL2.7V
20d – 32d (7)	BALANCING HARNESS, 18 CELL, CMS 2.6Z
33d (7)	INSULATOR, PET LAYER, BOTTOM COVER
34d (7)	INSULATOR, PET LAYER, TOP COVER
35d – 37d (7)	HARNESS, RING LUG THERMISTOR, 2-PIN MOLEX
38d (7)	SCREW, PPH, M3-0.5X14, YELLOW NYLON PATCH
39d (7)	PLUG, M32X1.5, CMS PCBA COVER
40d (7)	SCREW, PPH, M3X0.5MM, 9.5MM LENGTH, YELLOW ZINC-PLATED STEEL

Material Number	Item Description
41d (7)	STANDOFF, CENTER SUPPORT, PCBA
42d (7)	O-RING, 3/32 ID X 7/32 OD X 1/16 W, CLASS 2.90 DUROMETER, MILITARY FLUOROCARBON
1e	LID, 56V
2e	COVER, PCBA, 56V
3e	HOUSING, 56V
4e	TAPE, POLYESTER FILM, YLW, 1 MIL
5e, 15e	LABEL, PART/SERIAL NUMBER, MODULE
6e, 18e – 22e, 24e – 26e	PCBA, 56V PASSIVE, RoHS
7e	GROMMET, .47 OD .14 ID, NEOPRENE BLK
8e, 10e	CONNECTOR, PLUG, 4 SOCKET, LOCKING, PLASTIC
9e	CONN, WEDGLCK, FOR 4 SOCKET PLUG
11e	SCREW, 5mmx16mm LG, PH, TORX, THD FORM, STEEL ZN
12e	ARD, NEG TERM, MODULE 56V
13e	Threaded Brass
14e	LABEL, MODULE, BMOD0130 P056 B03
16e	ARD, POS TERM, MODULE 56V
17e	LABEL, WARNING, ELECTRICAL SHOCK, 1.25"x2.5"
23e	LABEL, TAMPER PROOF, 1/2" X 2"
27e	SCREW, SHCS, M8 X 16MM, STEEL, ZINC PLATED BLUE
28e	TERMINAL, M8, POS, 56V
	TERMINAL, M10, NEG, 56V
29e	SCREW, 5mm, 30mm LONG, PH, TORX, THD FORM, STEEL
30e-56e	CABLE HARNESS, BALANCING HARNESS, 56V, HST

(1) Materials 32-35 resubmitted on 2/25/2015
(2) Materials 91-106 submitted on 3/18/2015
(3) Materials 1a-65a submitted on 9/8/2015
(4) Materials 66a-78a submitted on 10/5/2015
(5) Materials 1b-30b submitted on 2/26/2016
(6) Materials 1c-19c submitted on 8/30/2016
(7) Materials 1d-43d submitted on 10/31/2016
(8) Materials 1e-56e submitted on 3/8/2017

All material data (except 1d-19d, 43d) referenced from TUV report #316G2725.001

Note: Materials 1-106 refer to 48V Module, Materials 1a-65a refer to 51V Module, Materials 66a-78a refer to 16V Module, Materials 1b-30b refer to additional 48V Module Components, Materials 1c-19c refer to 54V Module, Materials 1d-43d refer to 48V Bae Zion Module, Materials 1e- refer to 56V Module.

XOS XRF Report matrix

Material No.	ppm [mg/kg]				
	Cr^	Br^	Cd	Hg	Pb
1	ND<96.1	NT	ND<41.5	ND<24.9	13565 (6)
2	ND	223	ND<18.7	ND	17.9
3	ND<52.8	97058	ND<14.9	ND<10.5	ND<7.9
4	ND	ND	ND<7.0	ND	ND
5	ND	ND	ND<11.6	ND	ND
6	ND	ND	ND<7.0	ND	ND
7	ND	268	ND	ND	8.5
8	ND<21.7	NT	ND<6.5	ND	5
9	ND<15.9	NT	ND	ND	ND
10	ND	ND	ND<20.7	ND	ND
11	ND	ND	ND<31.8	ND	ND
12	ND	ND	ND<10.9	ND	ND
13	ND<20.2	NT	ND<11.4	ND	5.1
14	ND	ND	ND	ND	ND
15	ND	ND	ND<8.5	ND	ND
16	ND	ND	ND<11.4	ND	ND
17	ND	ND	ND<7.8	ND	ND
18	139589 (5)	NT	ND	ND<5.1	22.8
19	210	ND	ND<49.7	ND	ND
20	ND	36.4	ND<15.0	ND	ND<15.3
21	ND	376	ND<13.5	ND	ND
22	ND	ND	ND	ND	ND
23	ND	ND	ND<23.7	ND	ND
24	ND<15.8	ND	ND<5.9	ND	ND
25	ND<17.8	37.1	ND<35.2	ND	106
26	261266 (5)	NT	ND<10.7	ND<10.0	94.8
27	ND	ND	ND<23.5	ND	ND
28	ND	27	ND	ND	ND
29	ND	ND	ND<10.1	ND	ND
30	ND	ND	ND<9.2	ND	6.6
31	ND	ND	ND<27.7	ND	7.6
32	2259	ND	ND <7.1	ND <11.4	21.2
33	2947	ND	ND <5.7	ND <10.7	8.1
34	3692	ND	ND <6.1	ND <10.8	10.5
35	2907	ND	ND <5.6	ND <10.7	10.7
36	ND<31.8	NT	ND<6.5	ND	8.9
37	ND<67.0	90309	ND<18.9	ND<12.4	ND<9.2
38	ND<62.2	73547	ND<20.6	ND<11.7	ND<8.8
39	ND	NT	ND	ND	ND
40	ND<16.8	NT	ND	ND	ND
41	47.8	NT	ND<5.2	ND	22.9
42	ND	ND	ND<6.1	ND	ND
43	ND	ND	ND<6.8	ND	ND
44	ND	511	ND<18.4	ND	ND
45	ND	ND	ND<16.1	ND	ND

Material No.	ppm [mg/kg]				
	Cr^	Br^	Cd	Hg	Pb
46	ND	ND	ND<12.8	ND	ND
47	43654	214	ND<15.9	ND<7.1	WC
48	4083	NT	ND<19.4	ND<13.1	ND<40.6
49	ND	ND	ND<11.5	ND	11.9
50	ND	65.7	ND<8.4	ND	9
51	ND	ND	ND<19.0	ND	19.1
52	ND	ND	ND<48.5	ND	11.9
53	ND	ND	ND<43	ND	18.9
54	ND	ND	ND<9.3	ND	10.8
55	258937 (5)	NT	ND<12.2	ND<7.9	ND<83.8
56	ND<69.3	NT	WC	ND<8.3	51.3
57	ND	ND	ND<16.0	ND	ND
58	ND<17.6	ND	ND<28.1	ND	ND
59	1190	NT	ND<18.6	ND<24.4	ND<7.6
60	ND	ND	ND<7.2	ND	ND
61	ND	ND	ND<7.9	ND	ND
62	ND	6.5	ND	ND	ND
63	ND	5.6	ND<6.9	ND	ND
64	ND	ND	ND<5.9	ND	ND
65	ND	ND	ND	ND	ND
66	ND	ND	ND<5.1	ND	ND
67	ND	ND	ND	ND	7.7
68	ND	5.9	ND	ND	6.6
69	ND	10.5	ND<5.3	ND	18.4
70	ND	ND	ND<6.8	ND	ND
71	ND	5.3	ND<5.6	ND	ND
72	ND	17	ND<10.5	ND	ND
73	ND	ND	ND<7.6	ND	ND
74	ND	15346	ND<10.7	ND<144	9.2
75	ND	ND	ND<9.2	ND	6.1
76	ND	NT	ND<11.7	ND	5.4
77	397	NT	ND	ND	9.9
78	1038	NT	ND	ND	14
79	ND	ND	ND<7.5	ND	ND
80	ND	ND	ND<17.4	ND	ND
81	ND	ND	ND<10.2	ND	ND
82	ND	ND	ND	ND	16.1
83	31.2	NT	ND	ND	7.5
84	ND	NT	ND<12.5	ND	28.5
85	ND	ND	ND<13.1	ND	ND
86	420	ND	ND<18.9	ND	ND
87	ND<55.2	ND	ND<19.2	ND	ND
88	ND<56.2	ND	ND<34.0	ND	ND
89	ND	1413	ND<5.4	ND	ND
90	ND	6577	ND	ND<55.7	ND
91	ND	60.5	8.3	ND	ND
92	55622	ND	15.6	ND <8.6	WC

Material No.	ppm [mg/kg]				
	Cr^	Br^	Cd	Hg	Pb
93	ND	ND	ND	ND	ND
94	ND	7.4	ND	ND	ND
95	72.9	9827	11.5	ND	29.7
96	ND	31853	ND	ND	6.6
97	179823 (5)	NT	ND <8.1	ND <11.4	ND <414
98	ND	17.7	ND <7.5	ND	7.9
99	ND	14.2	ND	ND	6.4
100	ND	25.6	ND <7.2	ND	8.8
101	ND	9.8	ND	ND	10.6
102	16	499	ND <6.1	ND	13.3
103	24.8	ND	ND	ND	ND
104	31.2	10286	ND	ND	ND
105	ND	47.4	ND	ND	13.2
106	ND	1639	ND	ND	ND
1a	ND	5	ND <7.0	ND	8.6
2a	15.3	17434	ND	ND	ND <6.1
3a	ND	8	ND <8.1	ND	11.6
4a	ND	8.4	ND <7.5	ND	11.2
5a	ND	5	ND <8.4	ND	5.4
6a	248	NT	ND <31.6	ND <6.2	ND
7a	ND	ND	ND <9.5	ND	ND
8a	ND	ND	ND	ND	ND
9a	31.8	NT	ND	133	ND
10a	ND	ND	ND	ND	ND
11a	33.4	ND	ND <5.0	ND	ND
12a	229	82.1	ND <24.2	ND	WC
13a	46.7	NT	ND	289	80.1
14a	ND	7	ND <7.7	ND	ND
15a	18.8	6.4	ND	ND	ND
16a	24751	10.8	ND <6.6	ND	WC
17a	ND	8846	ND <17.9	ND	ND
18a	ND	7	ND	ND	ND
19a	101	NT	61.4	ND <15.1	14099 (6)
20a	ND	ND	ND	ND	ND
21a	ND	ND	ND	ND	ND
22a	ND	ND	ND	ND	ND
23a	ND	NT	ND <35.0	8.4	ND
24a	ND	ND	ND	ND	12.1
25a	ND	9.6	ND	ND	ND
26a	ND	109937	ND <16.2	ND <8.8	ND <10.3
27a	1012	NT	ND <69	ND <6.3	ND <6.3
28a	805	NT	ND <14.7	ND <18.4	ND <15.3
29a	142	NT	ND <8.0	ND	ND
30a	ND	ND	ND	ND	ND
31a	787	NT	ND <7.1	ND <16.1	ND <149
32a	22.3	58217	ND <11.6	ND <5.1	ND
33a	ND	ND	ND	ND	ND

Material No.	ppm [mg/kg]				
	Cr^	Br^	Cd	Hg	Pb
34a	ND	109385	ND <14.3	ND <8.9	ND <10.2
35a	3097	47.5	ND <8.6	ND <18.8	ND <189
36a	38.7	NT	ND <6.7	ND	ND
37a	188853 (5)	NT	ND <8.3	10.9	ND <311
38a	18.3	61089	ND <11.4	ND <5.2	23.7
39a	38.4	NT	ND <8.6	ND <11.5	9.5
40a	194	ND	ND <9.0	ND <23.9	ND <12.8
41a	22.1	50958	ND <10.8	ND <4.3	19.7
42a	ND	92.8	ND	ND	5.1
43a	ND	36	ND	ND	7.7
44a	ND	45.4	ND	ND	10
45a	ND	12.9	ND <6.2	ND	ND
46a	ND	6.1	ND <5.4	ND	ND
47a	ND	133281	ND <9.5	ND <11.7	ND <7.9
48a	15.6	ND	ND	ND	ND
49a	ND <28.0	13.4	ND	ND <5.4	7
50a	ND	NT	55.3	ND <12.8	11325 (6)
51a	ND <25.4	146120	ND <6.6	ND <32.2	ND <23.0
52a	13875	NT	ND <9.8	506	ND <158
53a	113	NT	ND <22.4	ND <7.8	ND <5.8
54a	29.2	NT	WC	ND	36.8
55a	ND	117263	ND <14.1	ND <10.3	70.7
56a	ND <28.1	27.6	ND <19.8	ND <8.1	6.7
57a	ND	ND	ND	ND	ND
58a	24.7	33.8	ND	ND	5.8
59a	ND	ND	ND <9.8	ND	ND
60a	ND	53.1	ND <11.1	ND <9.0	13.1
61a	21.8	152	ND	ND	ND
62a	ND	7.6	11.7	ND	ND
63a	383	243	WC	ND	WC
64a	ND	ND	ND	ND	ND
65a	771	43	WC	ND <4.2	335
66a	ND	6.8	ND <7.6	ND	8.3
67a	ND	6.3	ND <8.0	ND	11
68a	ND	7.2	ND <8.4	ND	13.4
69a	ND	6.3	ND <9.3	ND	10.4
70a	ND	ND	ND <8.4	ND	15.2
71a	36163	121	ND <7.5	ND	400
72a	ND <46.9	NT	WC	143	264
73a	ND	NT	ND <29.0	ND	ND
74a	62.2	ND	ND	ND	ND
75a	170682(5)	NT	ND <8.3	ND <10.7	170
76a	1731	NT	ND <52	ND <6.0	ND <9.6
77a	63	92.8	ND <5.9	ND	ND
78a	ND <59.6	62552	ND <7.6	ND <5.9	ND <5.8
1b	ND	ND	ND<7.6	ND	ND
2b	ND	ND	ND<11.3	ND	ND

Material No.	ppm [mg/kg]				
	Cr^	Br^	Cd	Hg	Pb
3b	ND	ND	ND<5.5	ND	ND
4b	ND	ND	ND	ND	ND
5b	ND	ND	ND<6.6	ND	ND
6b	ND	ND	ND	ND	ND
7b	ND	ND	ND	ND	ND
8b	ND	ND	ND<6.7	ND	ND
9b	ND	ND	ND<7.8	ND	ND
10b	ND	ND	ND<7.9	ND	ND
11b	ND	ND	ND<14.5	ND	ND
12b	ND	ND	ND<6.3	ND	ND
13b	ND	ND	ND<23.1	ND	ND
14b	ND<36.8	NT	ND<69	ND<13.0	68.1
15b	ND <22.1	NT	ND <13.3	ND <51.0	323932(7)
16b	ND	ND	ND<9.1	ND	ND
17b	ND	ND	ND<13.4	ND	ND
18b	ND	ND	ND<10.4	ND	13.1
19b	ND<48.9	81456	ND<14.4	ND<8.8	21.2
20b	ND	NT	ND<10.6	ND<69.1	9.6
21b	ND<57.2	94541	ND<15.3	ND<10.2	52.2
22b	251051(5)	NT	ND<11.8	ND<7.4	175
23b	ND<16.6	ND	ND<16.4	ND	11.7
24b	ND	ND	ND<10.4	ND	10.8
25b	ND	ND	ND<50.4	ND	6.1
26b	ND	ND	ND<14.3	ND	11.4
27b	ND<97.3	46732	ND<11.4	ND<6.1	ND
28b	ND	ND	ND	ND	ND
29b	ND	ND	ND<7.6	8.6	ND
30b	ND	NT	ND<10.7	ND<71.4	ND
1c	ND<27.1	ND	ND<16.2	ND	20
2c	ND<5.7	ND	ND<34.5	ND	11.6
3c	ND<14.6	ND	ND<19.5	ND	11.6
4c	ND<17.4	ND	ND<23.1	ND	14.7
5c	ND<23.8	ND	ND<18.8	ND	16
6c	ND	ND	ND<6.9	ND	ND
7c	ND<10.0	ND	ND<14.8	ND	ND
8c	ND<11.4	ND	ND<22.4	ND	ND
9c	ND<142	52702	ND<12.0	ND<493	ND<6.9
10c	ND<14.0	NT	ND<16.3	ND<82.1	6.9
11c	ND<74.4	83145	ND<21.0	ND<12.6	25.6
12c	ND<49.8	89311	ND<33.5	ND<10.0	46.9
13c	ND	ND	ND<18.1	ND	ND
14c	ND<9.1	ND	ND<10.2	ND	ND
15c	ND	ND	ND<7.0	ND	ND
16c	ND<5.6	ND	ND<15.5	ND	ND
17c	ND	ND	ND<17.4	ND	ND
18c	ND<7.3	ND	ND<27.8	ND	ND
19c	ND<23.9	ND	ND<7.9	ND	7

Material No.	ppm [mg/kg]				
	Cr^	Br^	Cd	Hg	Pb
1d	215	NT	ND	107	ND
2d	37.2	ND	ND	ND	ND
3d	ND	5.3	ND <8.0	ND	5.5
4d	ND <6.5	9.3	ND <7.7	ND	9.7
5d	ND	5.2	ND <8.2	ND	6.4
6d	ND	6	ND <7.6	ND	8.2
7d	ND	ND	ND <6.0	ND	7.1
8d	158013	NT	ND <7.7	ND <11.8	280
9d	92	13992	ND	ND	ND
10d	ND <6.5	90000	ND <18.7	ND <7.2	ND
11d	21.6	95620	ND <10.2	ND <8.6	ND
12d	ND <39.9	NT	ND <8.5	ND <22.3	ND <120
13d	16.8	ND	ND <5.3	ND	ND
14d	18202	ND	16	ND <16.8	3448(7)
15d	26.1	ND	ND <5.2	ND	ND
16d	ND <38.1	ND	36.2	ND	ND
17d	38.7	ND	ND	ND	ND
18d	ND <31.6	ND	ND <16.2	ND	ND
19d	22.6	ND	ND	ND	ND
20d	ND	5.2	ND <6.9	ND	ND
21d	ND	ND	ND <5.2	ND	ND
22d	1693	ND	ND	ND	ND
23d	ND	ND	ND	ND	7.9
24d	12.6	ND	ND	ND	ND
25d	ND	ND	ND	ND	ND
26d	ND <5.9	154444	ND <15.3	ND <12.8	39.3
27d	ND	ND	ND <6.0	ND	ND
28d	ND	ND	ND	ND	ND
29d	ND	ND	ND	ND	ND
30d	ND	ND	ND <7.1	ND	ND
31d	ND	ND	ND	ND	ND
32d	ND	ND	ND	ND	ND
33d	ND	ND	ND	ND	ND
34d	ND	ND	ND <6.5	ND	ND
35d	ND	ND	ND	ND	ND
36d	ND	ND	ND <7.7	ND	ND
37d	59.1	NT	ND <45.0	495	ND
38d	96.2	NT	ND <7.3	ND	ND
39d	ND	1535	ND	ND	ND
40d	121	NT	ND <10.3	ND	ND
41d	ND <6.7	103658	ND <12.6	ND <8.4	15.8
42d	ND	ND	ND	ND	ND
43d	ND	ND	ND	ND	ND
1e	390	50057	ND <16.3	ND <5.1	26.9
2e	317	50071	ND <11.9	ND <4.2	ND
3e	400	45603	ND <15.0	ND	ND
4e	ND	46	ND	ND	ND

Material No.	ppm [mg/kg]				
	Cr^	Br^	Cd	Hg	Pb
5e	ND	14.8	ND <6.9	ND	ND
6e	189	ND	ND <9.2	ND	7.3
7e	ND	ND	ND	ND	ND
8e	ND	130598	ND <18.9	ND <11.1	61.4
9e	249	28.9	ND	ND	ND
10e	28.1	38.9	ND	ND	ND
11e	1174	NT	ND <6.4	ND <13.6	ND <68.5
12e	24.3	58444	ND <14.1	ND <5.2	42
13e	43.8	NT	ND <25.4	ND <22.8	25450
14e	ND <30.5	14.9	ND <8.0	ND	ND
15e	ND	15.6	ND <5.4	ND	ND
16e	20.8	55557	ND <15.5	ND <4.9	ND
17e	1943	193	ND <9.5	ND <8.5	ND <9.3
18e	4648	28.5	202	ND	171
19e	25.3	568	ND	ND	8.3
20e	46.9	NT	ND <10.7	626	ND <16.2
21e	59.8	NT	ND <5.8	ND	ND
22e	ND	185	26.9	ND	46.9
23e	ND	53.8	ND	ND	ND
24e	192	NT	260	180	175
25e	ND <48.8	84465	ND	ND <7.4	ND
26e	17.1	NT	29.2	ND	6.3
27e	970	NT	ND <8.2	ND <23.9	24.3
28e	1924	NT	ND	ND	7
29e	1028	NT	ND <6.5	ND <26.0	ND <150
30e	ND	30.2	ND	ND	ND
31e	ND	17.9	ND <6.8	ND	ND
32e	ND	19.7	ND <8.1	ND	5.9
33e	ND	12.2	ND <6.4	ND	ND
34e	ND	12.8	ND <6.5	ND	ND
35e	ND	13	ND	ND	ND
36e	ND	ND	ND <6.5	ND	ND
37e	ND	18.1	ND <7.5	ND	8
38e	ND	12.3	ND <6.8	ND	6.3
39e	ND	10.1	ND <6.2	ND	ND
40e	ND	6.4	ND <8.7	ND	ND
41e	ND	11.9	ND <6.7	ND	6.8
42e	ND	9.1	ND <6.7	ND	ND
43e	ND	10	ND <6.9	ND	ND
44e	ND	30.6	ND <13.1	ND	ND
45e	ND	12.9	ND <6.2	ND	ND
46e	ND	13.9	ND <7.8	ND	7.8
47e	15.2	9	ND <6.6	ND	ND
48e	ND	10.1	ND	ND	ND
49e	21.8	13.1	ND <7.5	ND	ND
50e	ND	10.6	ND <7.2	ND	ND
51e	ND	251	ND	ND	ND

Material No.	ppm [mg/kg]				
	Cr^	Br^	Cd	Hg	Pb
52e	ND	11	ND <5.7	ND	ND
53e	ND	15.7	ND <8.2	ND	ND
54e	ND	151208	ND <11.6	ND <12.4	ND <8.7
55e	ND	40.7	ND <17.8	ND	ND
56e	ND	12.8	ND <6.9	ND	ND

Remark:

1. RED TEXT: These items are inconclusive by XRF-Screening - see **Wet Chemistry Confirmation Results section**
2. NT = Not Tested (Bromine in Alloys)
3. ND = Not Detected (less than limits of detection)
4. (WC) = See Wet Chemistry Results
5. Material identified as Stainless Steel. Chromium content is not subject to RoHS restrictions.
6. See exemption 6(c) Copper alloy containing up to 4% lead by weight.
7. See exemption 7(c) I. Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a glass or ceramic matrix compound.

	Cr	Br	Cd	Hg	Pb
Limits of Detection (mg/kg)	15	5	5	4	5

XRF Screening limits for different matrices

Materials	Unit(ppm)				
	Cr	Br	Cd	Hg	Pb
Metallic	P≤700<X	--	P ≤70<X≤130< F	P≤700<X≤1300<F	P≤700<X≤1300<F
Polymeric	P≤700<X	P≤300<X	P ≤70<X≤130< F	P≤700<X≤1300<F	P≤700<X≤1300<F
Electronic Components	P≤500<X	P≤250<X	P ≤40<X≤150< F	P≤500<X≤1500<F	P≤500<X≤1500<F

Wet Chemistry Confirmation Results

Heavy Metals

Cadmium and Lead		
Material No.	PPM (mg/kg) LOD 5 mg/kg	PPM (mg/kg) LOD 5 mg/kg
	Cd	Pb
47		29 mg/kg
56	<5 mg/kg	
92		411 mg/kg
12a		<5 mg/kg
16a		7 mg/kg

Wet Chemistry Confirmation Results

Heavy Metals

Cadmium and Lead		
Material No.	PPM (mg/kg) LOD 5 mg/kg	PPM (mg/kg) LOD 5 mg/kg
	Cd	Pb
54a	<5 mg/kg	
63a	<5 mg/kg	130 mg/kg
65a	<5 mg/kg	
72a	<5 mg/kg	
18e	<5 mg/kg	
24e	<5 mg/kg	

PBDE/PBB		
Material No.	PPM (mg/kg) LOD – 25 mg/kg	
	PBB	PBDE
3	<25mg/kg	<25mg/kg
7	<27mg/kg	<27mg/kg
21	<44mg/kg	<44mg/kg
37	<25mg/kg	<25mg/kg
38	<25mg/kg	<25mg/kg
44	<41mg/kg	<41mg/kg
74	<25mg/kg	39mg/kg
89	<25mg/kg	<25mg/kg
90	<32mg/kg	<32mg/kg
95	<31mg/kg	<31mg/kg
96	<25mg/kg	<25mg/kg
102	<25mg/kg	<25mg/kg
104	<27mg/kg	<27mg/kg
106	<25mg/kg	<25mg/kg
2a	<25mg/kg	<25mg/kg
17a	<53mg/kg	<53mg/kg
26a	<35mg/kg	<35mg/kg
32a	<35mg/kg	<35mg/kg
34a	<25mg/kg	<25mg/kg

38a	<28mg/kg	<28mg/kg
41a	<28mg/kg	<28mg/kg
47a	<29mg/kg	<29mg/kg
51a	<36mg/kg	<36mg/kg
55a	<37mg/kg	<37mg/kg
78a	<34mg/kg	<34mg/kg
19b	<37mg/kg	<37mg/kg
21b	<25mg/kg	<25mg/kg
27b	<25mg/kg	<25mg/kg
9c	<25mg/kg	<25mg/kg
11c	<38mg/kg	<38mg/kg
12c	<25mg/kg	<25mg/kg
9d	<25 mg/kg	<25 mg/kg
10d	<26 mg/kg	<26 mg/kg
11d	<40 mg/kg	<40 mg/kg
26d	<25 mg/kg	<25 mg/kg
39d	<25 mg/kg	<25 mg/kg
41d	<26 mg/kg	<26 mg/kg
1e	<25 mg/kg	<25 mg/kg
2e	<25 mg/kg	<25 mg/kg
3e	<25 mg/kg	<25 mg/kg
8e	<39 mg/kg	<39 mg/kg
12e	<26 mg/kg	<26 mg/kg
16e	<25 mg/kg	<25 mg/kg
19e	<30 mg/kg	<30 mg/kg
25e	<25 mg/kg	<25 mg/kg
51e	<25 mg/kg	<25 mg/kg
54e	<42 mg/kg	<42 mg/kg

Hexavalent Chromium:

Polymers

Material no.	Cr VI Content [*1] LOD - 100 mg/kg
47	<100 mg/kg
92	<100 mg/kg
71a	<100 mg/kg
22d	<100 mg/kg
17e	<100 mg/kg

Metals

Material no.	Spot test for Cr VI [a1]
32	Negative
33	Negative
34	Negative
35	Negative
48	Negative
59	Negative
78	Negative
16a	Negative
27a	Negative
28a	Negative
31a	Negative
35a	Negative
52a	Negative
65a	Negative
76a	Negative
8d	Negative
14d	Negative
18e	Negative
27e	Negative
28e	Negative
29e	Negative

Remark:

(*1) The total chromium content in sample was found to be above 1000ppm. Thus, the Chromium VI content was determined with reference to IEC 62321.

Instrument	Supplier/Vendor	Model / Type
X-ray Fluorescence Spectrometry	XOS	HD Prime
ICP-MS	Agilent Technologies Inc.	7700
GC-MS	Agilent Technologies Inc.	6890/5975

3. Exemptions

Annex III: Applications exempted from the restriction in Article 4(1)

1. Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):
   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

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

c) For general lighting purposes ≥ 50 W and < 150 W: 5 mg

d) For general lighting purposes ≥ 150 W: 15 mg

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

f) For special purposes: 5 mg

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. Mercury in double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp):
   a) Tri-band phosphor lamps
      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. 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
      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
      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
      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
   b) Mercury in other fluorescent lamps not exceeding (per lamp):
      1. Linear halophosphate lamps with tube > 28 mm (e.g. T10 and T12): 10 mg
         Expires on 13 April 2012
      2. Non-linear halophosphate lamps (all diameters): 15 mg
         Expires on 13 April 2016
      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
      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):
   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
   b) Medium length (> 500 mm and ≤ 1500 mm)
      No limitation of use until 31 December 2011; 5 mg may be used per lamp after 31 December 2011
   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
   b) Mercury in High Pressure Sodium (vapor) lamps for general lighting purposes not exceeding (per burner) in lamps with improved color rendering index Ra > 60:
      I. P ≤ 155 W
         No limitation of use until 31 December 2011; 30 mg may be used per burner after 31 December 2011
      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
      III. P > 405 W
         No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011
   c) Mercury in other High Pressure Sodium (vapor) lamps for general lighting purposes not exceeding (per burner):
      i. P ≤ 155 W
         No limitation of use until 31 December 2011; 25 mg may be used per burner after 31 December 2011
      ii. 155 W < P ≤ 405 W
         No limitation of use until 31 December 2011; 30 mg may be used per burner after 31 December 2011
      iii. P > 405 W

No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011

d) Mercury in High Pressure Mercury (vapor) lamps (HPMV)
Expires on 13 April 2015

e) Mercury in metal halide lamps (MH)

f) Mercury in other discharge lamps for special purposes not specifically mentioned in this Annex

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.

5.
a) Lead in glass of cathode ray tubes
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
b) Lead as an alloying element in aluminum containing up to 0,4 % lead by weight
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)
b) Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission, and network management for telecommunications
c)
   I. Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a glass or ceramic matrix compound
   II. Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher
   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
   IV. Lead in PZT based dielectric ceramic materials for capacitors which are part of integrated circuits or discrete semiconductors
   Expires on 21 July 2016

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
b) Cadmium and its compounds in electrical contacts

9.
a) 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
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
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
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
Expired 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 specialty lamps for diazoprinting reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS ((Sr,Ba) 2 MgSi 2 O 7 :Pb)
    Expired on 1 January 2011
    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 2 O 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 machine 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 several hours at acoustic power levels of 125 dB SPL and above) loudspeakers
    Expired on 24 September 2010
29. Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC (1)
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 aluminum bonded beryllium oxide
39. Cadmium in color 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

Annex IV: restrictions specific to medical devices and monitoring and control instruments

Equipment utilizing or detecting ionizing radiation

1. Lead, cadmium and mercury in detectors for ionizing radiation.
2. Lead bearings in X-ray tubes.
3. Lead in electromagnetic radiation amplification devices: micro-channel plate and capillary plate.
4. Lead in glass frit of X-ray tubes and image intensifiers and lead in glass frit binder for assembly of gas lasers and for vacuum tubes that convert electromagnetic radiation into electrons.
5. Lead in shielding for ionizing radiation.
6. Lead in X-ray test objects.
7. Lead stearate X-ray diffraction crystals.
8. Radioactive cadmium isotope source for portable X-ray fluorescence spectrometers.

Sensors, detectors and electrodes

1a. Lead and cadmium in ion selective electrodes including glass of pH electrodes.

1b. Lead anodes in electrochemical oxygen sensors.
1c. Lead, cadmium and mercury in infra-red light detectors.
1d. Mercury in reference electrodes: low chloride mercury chloride, mercury sulphate and mercury oxide.

Others

9. Cadmium in helium-cadmium lasers.
10. Lead and cadmium in atomic absorption spectroscopy lamps.
11. Lead in alloys as a superconductor and thermal conductor in MRI.
12. Lead and cadmium in metallic bonds creating superconducting magnetic circuits in MRI, SQUID, NMR (Nuclear Magnetic Resonance) or FTMS (Fourier Transform Mass Spectrometer) detectors. Expires on 30 June 2021.
13. Lead in counterweights.
14. Lead in single crystal piezoelectric materials for ultrasonic transducers.
15. Lead in solders for bonding to ultrasonic transducers.
16. Mercury in very high accuracy capacitance and loss measurement bridges and in high frequency RF switches and relays in monitoring and control instruments not exceeding 20 mg of mercury per switch or relay.
17. Lead in solders in portable emergency defibrillators.
18. Lead in solders of high performance infrared imaging modules to detect in the range 8-14 µm.
19. Lead in Liquid crystal on silicon (LCoS) displays.
20. Cadmium in X-ray measurement filters.
21. Cadmium in phosphor coatings in image intensifiers for X-ray images until 31 December 2019 and in spare parts for X-ray systems placed on the EU market before 1 January 2020.
22. Lead acetate marker for use in stereotactic head frames for use with CT and MRI and in positioning systems for gamma beam and particle therapy equipment. Expires on 30 June 2021.
23. Lead as an alloying element for bearings and wear surfaces in medical equipment exposed to ionizing radiation. Expires on 30 June 2021.
24. Lead enabling vacuum tight connections between aluminum and steel in X-ray image intensifiers. Expires on 31 December 2019.
25. Lead in the surface coatings of pin connector systems requiring nonmagnetic connectors which are used durably at a temperature below – 20 °C under normal operating and storage conditions. Expires on 30 June 2021.
26. Lead in
    - solders on printed circuit boards,
    - termination coatings of electrical and electronic components and coatings of printed circuit boards,
    - solders for connecting wires and cables,
    - solders connecting transducers and sensors,

    that are used durably at a temperature below – 20 °C under normal operating and storage conditions.
    Expires on 30 June 2021.
27. Lead in
    - solders,
    - termination coatings of electrical and electronic components and printed circuit boards,
    - connections of electrical wires, shields and enclosed connectors,

    which are used in
    a) magnetic fields within the sphere of 1 m radius around the isocentre of the magnet in medical magnetic resonance imaging equipment, including patient monitors designed to be used within this sphere, or
    b) magnetic fields within 1 m distance from the external surfaces of cyclotron magnets, magnets for beam transport and beam direction control applied for particle therapy.
    Expires on 30 June 2020.
28. Lead in solders for mounting cadmium telluride and cadmium zinc telluride digital array detectors to printed circuit boards. Expires on 31 December 2017.
29. Lead in alloys, as a superconductor or thermal conductor, used in cryo-cooler cold heads and/or in cryo-cooled cold probes and/or in cryo-cooled equipotential bonding systems, in medical devices (category 8) and/or in industrial monitoring and control instruments. Expires on 30 June 2021.
30. Hexavalent chromium in alkali dispensers used to create photocathodes in X-ray image intensifiers until 31 December 2019 and in spare parts for X-ray systems placed on the EU market before 1 January 2020.
31. Lead, cadmium and hexavalent chromium in reused spare parts, recovered from medical devices placed on the market before 22 July 2014 and used in category 8 equipment placed on the market before 22 July 2021, provided that reuse takes place in auditable closed-loop business-to-business return systems, and that the reuse of parts is notified to the consumer. Expires on 21 July 2021.

32. Lead in solders on printed circuit boards of detectors and data acquisition units for Positron Emission Tomographs which are integrated into Magnetic Resonance Imaging equipment. Expires on 31 December 2019.
33. Lead in solders on populated printed circuit boards used in Directive 93/42/EEC class IIa and IIb mobile medical devices other than portable emergency defibrillators. Expires on 30 June 2016 for class IIa and on 31 December 2020 for class IIb.
34. Lead as an activator in the fluorescent powder of discharge lamps when used for extracorporeal photopheresis lamps containing BSP (BaSi 2 O 5 :Pb) phosphors. Expires on 22 July 2021.
35. Mercury in cold cathode fluorescent lamps for back-lighting liquid crystal displays, not exceeding 5 mg per lamp, used in industrial monitoring and control instruments placed on the market before 22 July 2017.
    Expires on 21 July 2024.
36. Lead used in other than C-press compliant pin connector systems for industrial monitoring and control instruments.
    Expires on 31 December 2020. May be used after that date in spare parts for industrial monitoring and control instruments placed on the market before 1 January 2021.
37. Lead in platinized platinum electrodes used for conductivity measurements where at least one of the following conditions applies:
    a) wide-range measurements with a conductivity range covering more than 1 order of magnitude (e.g. range between 0.1 mS/m and 5 mS/m) in laboratory applications for unknown concentrations;
    b) measurements of solutions where an accuracy of +/– 1 % of the sample range and where high corrosion resistance of the electrode are required for any of the following:
        i. solutions with an acidity < pH 1;
        ii. solutions with an alkalinity > pH 13;
        iii. corrosive solutions containing halogen gas;
    c) measurements of conductivities above 100 mS/m that must be performed with portable instruments.
    Expires on 31 December 2018
38. Lead in solder in one interface of large area stacked die elements with more than 500 interconnects per interface which are used in X-ray detectors of computed tomography and X-ray systems.
    Expires on 31 December 2019. May be used after that date in spare parts for CT and X-ray systems placed on the market before 1 January 2020.'
39. Lead in micro-channel plates (MCPs) used in equipment where at least one of the following properties is present:
    a) a compact size of the detector for electrons or ions, where the space for the detector is limited to a maximum of 3 mm/MCP (detector thickness + space for installation of the MCP), a maximum of 6 mm in total, and an alternative design yielding more space for the detector is scientifically and technically impracticable;
    b) a two-dimensional spatial resolution for detecting electrons or ions, where at least one of the following applies:
        i. a response time shorter than 25 ns;
        ii. a sample detection area larger than 149 mm2;
        iii. a multiplication factor larger than 1,3 × 103.
    c) a response time shorter than 5 ns for detecting electrons or ions;
    d) a sample detection area larger than 314 mm2 for detecting electrons or ions;
    e) a multiplication factor larger than 4,0 × 107.
    The exemption expires on the following dates:
    (a) 21 July 2021 for medical devices and monitoring and control instruments;
    (b) 21 July 2023 for in-vitro diagnostic medical devices;
    (c) 21 July 2024 for industrial monitoring and control instruments.
40. Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC for industrial monitoring and control instruments.
    Expires on 31 December 2020. May be used after that date in spare parts for industrial monitoring and control instruments placed on the market before 1 January 2021.
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 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
    Expires on 31 December 2018

-End of Report-