

Management standard for environment-related substances

Version: 1.4

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Revision history

Version	Revised date	Revised by	Revised content
1.0	2010-11-23	Luo jinhua 罗金华	Creation of Document. Replace the standard as follow: <Limited / Embargo Material Management Standard for Product (For Chinese market) Q/TMC G09-2007>、 <Limited / Embargo Material Management Standard for Product (For Oversea market) TS-D-M-0001>
1.1	2012-02-13	Luo jinhua 罗金华	1. Update “5. Requirements for hazardous substances”, “Appendix A”, “Appendix B”, “Appendix C” and “Appendix E”, Delete “6. SVHC of TCL Communication”, Add “6. Requirements for conflict minerals”. 2. Update < Supplier’s environmental declaration >, Add < Declaration: Do not use conflict minerals >.
1.2	2012-04-26	Luo jinhua 罗金华	1. Update “5. Requirements for restricted substances”. 2. Add “6. Voluntary restricted substances”. 3. Update the declaration and questionnaire.
1.3	2013-03-31	Luo jinhua 罗金华	1. Update “4.2 test report”: Test report is valid for 2 years. English report. 2. Update “5.1.3 Further requirements on batteries”: Delete lead’s limit value. Add the mark requirements. 3. Update “5.2.2 Annex XVII restriction list”: Revise PCN’s limit value. Delete “Diphenylether, octabromo derivative(C ₁₂ H ₂ Br ₈ O)”. 4. Update “5.3 Substances restricted by other regulations”: Add the requirements of POPs directive (No 850/2004). 5. Update “5.4 Halogen free”: Revise PVC’s limit value. 6. Update “6 Voluntary restricted substances”: Add limit value for “6.1 Hazardous substance”. Add “6.2 Rare metal”. 7. Update “7. Requirements for conflict minerals”: Delete Silver (Ag), Cobalt (Co), Palladium (Pd) and Nickel (Ni). 8. Update “8. Related document”: Add document ”Declaration: Not use conflict minerals”, “Packaging declaration of conformity” and “Declaration of conformity D05-008”. 9. Add “Reference test method” for substances. 10. Delete “Appendix A: SVHC candidate list”. 11. Update “Appendix A: Exemptions list of EU RoHS directive” and “Appendix D: References”.

1.4	2014-10-07	Luo jinhua 罗金华	<ul style="list-style-type: none"> 1) Update “Appendix A: Exemptions list of EU RoHS directive”. 2) Update “5.3 Substances restricted by other regulations and standards”: <ul style="list-style-type: none"> ① Add the requirements for three phthalate, requirements from “UL ISR 110 (ULE)” and “Kcell customer”. ② Update the requirement of PAH, the new requirement is to become effective on and from July 1, 2015. 3) Revise the laboratory requirements of “4.2 Test report (TR)”. 4) Update some requirements and description.

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1 Purpose

The purpose of requirements concerning chemical substances in TCT products is to:

- Ensure TCT products compliance with the requirements of regulations and customers.
- Minimise harmful effects to human health and environment from TCT products.

2 Scope of application

Product and its components (including packaging、auxiliary materials(e.g. gluewater、lubricating oil、solder、solder paste)) must fulfill the requirements in this standard.

Unless otherwise specified, the requirements in this standard are valid for each separate homogeneous material in the products. Wherever overlapping restrictions/requirements concerning the same substance, the strictest restriction/requirement is valid. The content of hazardous substance shall below the limit value in this standard, the exempt materials refer to the latest requirements in the laws.

All references in this standard, refer to the latest version of the standards and laws. When new substances are added to the lists (e.g. SVHC candidate list) that are referred to in this standard, the updated lists are being the effective content in this standard. And the requirements for these new substances shall be fulfilled according to the standards and regulations, unless otherwise specified.

Note that the requirements apply to materials in products. This means that it is not sufficient to secure compliance for raw material as it is used in production; avoiding contamination during the manufacturing process and during storage and transport is also necessary.

3 Term definition

- Environment-related substance: Chemical substances listed in the environmental regulations and client's requirements.
- Homogenous material: A material that cannot be mechanically disjointed into different materials. The term "mechanically disjointed" refers to mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes. Examples of homogenous materials are individual types of: plastics, ceramics, glass, metals, alloys, paper, board, resins, and coatings. Surface conversions such as chromating are also seen as separate "homogenous materials". Example an electric cable that consists of metal wires surrounded by non-metallic insulation materials – in this case the limit values would apply to each of the separable materials individually. Small electronic components, e.g. an individual transistor on a printed circuit board, can be seen as a non-disjointable and thus as a "homogenous material" in this specification. The printed circuit board base, without soldering and components, can also be seen as non-disjointable "homogenous material".

4 Requirements for documentation

4.1 Self declaration (SD)

- This self declaration (SD) is created by TCT according to this standard, e.g. RoHS environmental declaration.
- The declaration is appropriate for all the suppliers of TCT, it has legal effect and becomes effective when supplier signs. Whenever supplier promises to compliant with the requirements, meanwhile, and be responsible for passing on the requirements in the supply chain.

4.2 Test report (TR)

- Test report shall be issued by the laboratory which [comply with ISO/IEC 17025](#), e.g. SGS, TUV, ITS, TUV, BV, CTI;
- Issued date shall be within 2 years. The consolidated test report shall be renewed before the oldest single test report included in it is 2 years old;
- Test report shall be legible and integral;
- Correct test method;
- English language report;
- Test report available as soft copy is acceptable.

4.3 Other documentations

- Questionnaire for environment-related substances;
- Chemical composition form;
- Material Safety data sheet (MSDS/SDS).

4.4 The opportunity to provide documentations

- New product development;
- Change supplier or sub-supplier, change components or the raw materials;
- Chemical or productive technology change which will result in the hazardous substance changes in products;
- When TCT ask, supplier can provide the documentations related to products.

5 Requirements for restricted substances

5.1 RoHS directive, packaging directive and battery directive

Requirements of chapter 5.1 apply to all TCT products, these are mandatory requirements.

5.1.1 General requirements for all materials

Substance	Requirements of limit value (ppm = mg/kg)	Reference test method	Reference standard and regulation
Lead (Pb) and its compounds	Lead's limit value: 1000 ppm (0.1%). Exemption: e.g. Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0,35 % lead by weight; Lead as an alloying element in aluminium containing up to 0,4 % lead by weight; Copper alloy containing up to 4 % lead by weight; Lead in high melting temperature type solders.	IEC 62321	2011/65/EU
Cadmium(Cd) and its compounds	Cadmium's limit value: 100 ppm (0.01%).	IEC 62321	
Mercury(Hg) and its compounds	Mercury's limit value: 1000 ppm (0.1%).	IEC 62321	
Hexavalent chromium(Cr6+) and its compounds	Hexavalent chromium's limit value: 1000 ppm (0.1%).	IEC 62321	
Polybrominated biphenyl (PBB)	Limit value: 1000 ppm (0.1%). This requirement is not relevant for the materials glass, ceramics and metal.	IEC 62321	
Polybrominated Diphenyl Ethers (PBDE)	Limit value: 1000 ppm (0.1%). This requirement is not relevant for the materials glass, ceramics and metal.	IEC 62321	

Note: For the exemptions listed in EU RoHS directive. Please refer to "Appendix A: [Exemptions list of EU RoHS directive](#)".

5.1.2 Further requirements on packaging material

Substance	Requirements of limit value (ppm = mg/kg)	Reference test method	Reference standard and regulation
Lead (Pb)and its compounds Cadmium (Cd)and its compounds Mercury (Hg) and its compounds Hexavalent chromium (Cr6+) and its compounds	Limit value: The sum of concentration of lead, mercury, cadmium, and hexavalent chromium in the packaging material shall be less than 100 ppm (0.01%).	IEC 62321	94/62/EC
Polrvinyl chloride (PVC)	No content permitted.	KS 0210	
Expanded polystyrene (EPS)	No content permitted.		

5.1.3 Further requirements on batteries

Substance	Requirements of limit value (ppm = mg/kg)	Reference test method	Reference standard and regulation
Cadmium(Cd) and its compounds	Cadmium's limit value: 20 ppm (0.002%).	IEC 62321	2006/66/EC
Mercury(Hg) and its compounds (Excluding button cells)	Mercury's limit value: 5 ppm (0.0005%).		
Mercury (Hg) and its compounds (Button cells)	Mercury's limit value: 20000 ppm (2%).		

Note: When batteries meet any of the following conditions, shall be marked with the chemical simbol for the metal concerned (Pb, Cd or Hg):

- 1) All batteries containing lead more than 40 ppm (0.004%).
- 2) Button cells containing mercury more than 5 ppm (0.0005%).
- 3) Portable batteries and accumulators are used in emergency and alarm systems (including emergency lighting), or medical equipment, or cordless power tools, and containing cadmium more than 20 ppm (0.002%).

5.2 REACH regulation

Requirements of chapter 5.2 only apply to the TCT products which sold to EU market. Other market's products depend on TCT customer's requirements. Suppliers shall carry out following requirements when they are told that materials shall comply with REACH requirements.

5.2.1 SVHC candidate list

General requirements for all materials.

Substance	Requirements of limit value (ppm = mg/kg)	Reference test method	Reference standard and regulation
<p>SVHC (Substances of Very High Concern) In the "SVHC candidate list".</p> <p>SVHC:</p> <p>1) CMR substance</p> <p>2) "PBT substances" and "vPvB substances"</p> <p>3) Other substances that have serious damage to human health and environment (e.g. endocrine disrupting chemicals).</p>	<p>Limit value for each SVHC in whole product: 1000 ppm (0.1%)</p> <p>"SVHC candidate list" will be updated continuously. When ECHA updates the "SVHC candidate list", the new substances must be controled in five months.</p>	<p>Different extraction and analysis methods depending on which materials and substances to be tested.</p>	<p>No 1907/2006</p>

Note: 1) The definition of CMR substance, PBT substances and vPvB substances can be found in "Appendix D: [References](#)".

2) Public consultation and assessment will be made before new substances are added into "SVHC candidate list" (i.e. public consultation and assessment will be made for the substances listed in "SVHC proposal list"). The substances in "SVHC proposal list" do not require to be controlled. But TCT supplier should focus on "SVHC proposal list" and take steps when necessary. "SVHC candidate list" and "SVHC proposal list" can be found on ECHA official site, website please see "Appendix D: [References](#)".

5.2.2 Annex XVII restriction list

General requirements for all materials.

Substance	Requirements of limit value (ppm = mg/kg)	Reference test method	Reference standard and regulation
Dimethylfumarate (DMF), CAS No.: 624-49-7	Limit value: 0.1 ppm (0.00001%). High-risk materials: silica gel bags.	EPA-3540C	No 1907/2006
Arsenic' s compounds	Limit value: 1000 ppm (0.1%).	EPA-3050B EPA-3052	No 1907/2006
Nickel (Ni) and its compounds	Nickel's release limit value: 0.5 µg/cm ² /week. <i>This requirement only apply to parts that come into direct and prolonged contact with skin. e.g. outer casing keypad, data line, earphone and charger.</i>	Analysis according to EN 1811. For material with coating or plating: wear and corrosion shall be done according to EN 12472	No 1907/2006
Pentachlorophenol (PCP) including salts and esters of PCP	Limit value: 1000 ppm (0.1%).	Wood materials: CEN/TR 14823 Textile materials and polymers: ISO 17070	No 1907/2006
Azodyes	Limit value for each arylamine (see appendix B): 30 ppm (0.003%). <i>Azodyes which, by reductive cleavage of one or more azo groups, may release one or more of the carcinogenic aromatic amines. This requirement only apply to textile and leather articles which may come into direct and prolonged contact with the human skin or oral cavity.</i>	EN 14362-1 and EN 14362-2	No 1907/2006

<ul style="list-style-type: none"> • Polychlorinated biphenyls (PCB) • Polychlorinated terphenyls (PCT) • Polychlorinated naphthalenes (PCN) 	<p>PCB's limit value: 50 ppm (0.005%).</p> <p>PCT's limit value: 50 ppm (0.005%).</p> <p>PCN's limit value: No content permitt</p>	<p>EPA 8082</p>	<p>No 1907/2006</p>
<p>Organotin compounds:</p> <ul style="list-style-type: none"> • Dibutyltin compounds (DBT) • Dioctyltin compounds (DOT) • Tributyltin compounds (TBT) • Triphenyltin compounds (TPT) 	<p>Tin's limit value: 1000 ppm.(0.1%).</p>	<p>DIN 38407</p>	<p>No 1907/2006</p>
<p>Asbestos fibres:</p> <ul style="list-style-type: none"> • Crocidolite, CAS No.: 12001-28-4 • Amosite, CAS No.: 12172-73-5 • Anthophyllite, CAS No.: 77536-67-5 • Actinolite, CAS No.: 77536-66-4 • Tremolite, CAS No.: 77536-68-6 • Chrysotile, CAS No.: 12001-29-5 CAS No.: 132207-32-0 	<p>Not allowed to be added intentionally.</p>	<p>EPA-0435</p>	<p>No 1907/2006</p>
<p>Monomethyl-tetrachlorodiphenyl methane Trade name: Ugilec 141 CAS No.: 76253-60-6</p>	<p>No content permitted.</p>	<p>EPA 3540C</p>	<p>No 1907/2006</p>
<p>Monomethyl-dichloro-diphenyl methane Trade name: Ugilec 121, Ugilec 21</p>	<p>No content permitted.</p>	<p>EPA 3540C</p>	<p>No 1907/2006</p>

Monomethyl-dibromo-diphenyl methane bromobenzylbromotoluene, mixture of isomers Trade name: DBBT CAS No.: 99688-47-8	No content permitted.	EPA 3540C	No 1907/2006
Tris (2,3 dibromopropyl) phosphate, CAS No.: 126-72-7	No content permitted. This requirement only apply to textile.	EPA 3540C EPA 3550B	No 1907/2006
Tris(aziridinyl)phosphinoxide, CAS No.: 545-55-1	No content permitted. This requirement only apply to textile.		No 1907/2006

5.3 Substances restricted by other regulations and standards

Requirements of chapter 5.3 only apply to the TCT products which sold to EU market and USA market (Unless otherwise specified). Other market's products depend on TCT customer's requirements. Suppliers shall carry out following requirements when they are told that materials shall comply with these requirements.

General requirements for all materials.

Substance	Requirements of limit value (ppm = mg/kg)	Reference test method	Reference standard and regulation
Lead (Pb) and its compounds	Lead's limit value: 300 ppm (0.03%). This requirement only apply to the products which sold to EU market and USA market. In PVC Coated Cords, including data line, earphone and charger.	IEC 62321	California Proposition 65

Polycyclic aromatic hydrocarbons (PAH)	Limit values for benzo(a)pyrene: <ul style="list-style-type: none"> • 20 ppm (0.002%) for non-skin contact materials. • 1 ppm (0.0001%) for skin contact materials. 	ISO 18287	ZEK 01.4-08																																										
	Limit values for total of 18 polycyclic aromatic hydrocarbons (see appendix C): <ul style="list-style-type: none"> • 200 ppm (0.02%) for non-skin contact materials. • 10 ppm (0.001%) for skin-contact materials. 																																												
The following new requirement of PAH is to become effective on and from July 1, 2015.																																													
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Substance</th> <th style="text-align: center;">Skin contact materials</th> <th style="text-align: center;">Non-skin contact materials</th> </tr> </thead> <tbody> <tr> <td>Benzo(a)pyrene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Benzo[e]pyrene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Benzo(a)anthracene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Benzo(b)fluoranthene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Benzo(j)fluoranthene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Benzo(k)fluoranthene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Chrysene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Dibenzo(a,h)anthracene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Benzo(g,h,i)perylene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Indeno(1,2,3-cd)pyrene</td> <td style="text-align: center;">0.5 ppm</td> <td style="text-align: center;">1 ppm</td> </tr> <tr> <td>Naphthalene</td> <td style="text-align: center;">2 ppm</td> <td style="text-align: center;">10 ppm</td> </tr> <tr> <td>Sum of 7 PAH(Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Pyrene, Anthracene, Fluoranthene)</td> <td style="text-align: center;">10 ppm</td> <td style="text-align: center;">50 ppm</td> </tr> <tr> <td>Sum of 18 PAH</td> <td style="text-align: center;">10 ppm</td> <td style="text-align: center;">50 ppm</td> </tr> </tbody> </table>				Substance	Skin contact materials	Non-skin contact materials	Benzo(a)pyrene	0.5 ppm	1 ppm	Benzo[e]pyrene	0.5 ppm	1 ppm	Benzo(a)anthracene	0.5 ppm	1 ppm	Benzo(b)fluoranthene	0.5 ppm	1 ppm	Benzo(j)fluoranthene	0.5 ppm	1 ppm	Benzo(k)fluoranthene	0.5 ppm	1 ppm	Chrysene	0.5 ppm	1 ppm	Dibenzo(a,h)anthracene	0.5 ppm	1 ppm	Benzo(g,h,i)perylene	0.5 ppm	1 ppm	Indeno(1,2,3-cd)pyrene	0.5 ppm	1 ppm	Naphthalene	2 ppm	10 ppm	Sum of 7 PAH(Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Pyrene, Anthracene, Fluoranthene)	10 ppm	50 ppm	Sum of 18 PAH	10 ppm	50 ppm
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This requirement only apply to “GS certification products”. Apply to the polymers (including plastics, silicone, and rubber/elastomers/latex) which come to direct and frequently contact with the human skin or oral cavity.																																													
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<p>Ozone Depleting Substances(ODS):</p> <ul style="list-style-type: none"> • CFCs (Chlorofluorocarbons) • HCFCs (Hydrogenated chlorofluorocarbons) • Halons • Methyl Bromide • HBFCs (Hydrobromofluorocarbons), • 1,1,1-Trichloroethane • Carbon tetrachloride • Bromochloromethane 	<p>No content permitted.</p>	<p>EPA 5021A EPA 8260B EPA-8021B</p>	<p>No 2037/2000 Montreal Protocol</p>
<p>PFOA/PFOS/PFOSA and their derivatives</p>	<p>Limit value: 1000 ppm (0.1%). Textile and coating materials: 1µg/m².</p>	<p>LC/MS</p>	<p>No 850/2004</p>
<p>Short-chain chlorinated paraffins (Alkanes C10-C13, chloro) (SCCPs), CAS No.: 85535-84-8</p>	<p>No content permitted.</p>	<p>EPA 3540C EPA 3550C</p>	<p>No 850/2004</p>
<p>Hexachlorobutadiene, CAS No.: 87-68-3</p>	<p>No content permitted.</p>		<p>No 850/2004</p>
<p>Dibutyl phthalate (DBP), CAS No.: 84-74-2</p>	<p>Limit value: 1000 ppm (0.1%). This requirement only apply to “ULE certification products” and “Kcell customer’s products”.</p>		
<p>Benzyl butyl phthalate (BBP), CAS No.: 85-68-7</p>	<p>Limit value: 1000 ppm (0.1%). This requirement only apply to “ULE certification products” and “Kcell customer’s products”.</p>		<p>UL ISR 110 (ULE)</p>
<p>Bis(2-ethylhexyl)phthalate (DEHP), CAS No.: 117-81-7</p>	<p>Limit value: 1000 ppm (0.1%). This requirement only apply to “ULE certification products” and “Kcell customer’s products”.</p>		

5.4 Halogen free

Requirements of chapter 5.4 only apply to some TCT products, it depends on TCT customer's requirements. Suppliers shall carry out following requirements when they are told that materials shall comply with these requirements.

General requirements for all materials.

Substance	Requirements of limit value (ppm = mg/kg)	Reference test method	Reference standard and regulation
Polrvinyl chloride (PVC)	Limit value: 1000 ppm (0.1%).	KS 0210	
Bromine (Br) Chlorine (Cl)	Bromine's limit value: 900 ppm (0.09%). Chlorine's limit value: 900 ppm (0.09%). Bromine and Chlorine's total content limit value: 1500 ppm (0.15%).	BS EN 14582	IEC61249-2-21

6 Voluntary restricted substances

Substances listed in chapter 6 are environmentally hazardous substances and rare metals. So far TCT doesn't take these as mandatory requirements, but hope supplier do it voluntary.

6.1 Hazardous substance

Substance	Requirements of limit value (ppm = mg/kg)	Reference test method	Applicative material
BisPhenolA (BPA), CAS No.: 80-05-7	Migration limit value: 0.60 mg/l.	EN 14372	In polymers, including plastics, silicone, and rubber/elastomers/ atex. High-risk material: polycarbonate(PC).
Tetrabromobisphemol A (TBBPA), CAS No.: 79-94-7	Limit value: 1000 ppm (0.1%) .	EPA-3540C EPA-3545 EPA-3550B	In polymers, including plastics, silicone, and rubber/elastomers/ latex.
Beryllium (Be) and its compounds	Beryllium's limit value: 1000 ppm (0.1%) .	EPA 3052 EPA 3050B	

Antimony (Sb) and its compounds	Antimony's limit value: 1000 ppm (0.1%) .	EPA 3052 EPA 3050B	
Bismuth (Bi) and its compounds	Bismuth's limit value: 1000 ppm (0.1%) .	EPA 3052 EPA 3050B	
Selenium (Se) and its compounds	Selenium's limit value: 1000 ppm (0.1%) .	EPA 3052 EPA 3050B	
Formaldehyde, CAS No.: 50-00-0	Migration limit value: 2.5 mg/l.	EN 71-10 and EN 71-11	In polymers, coating and wood.
Alkylphenoethoxylates (APEO)	Skin-contact materials: 100 ppm (0.01%) . Non-skin-contact materials: 250 ppm (0.025%) . The limit value of ready-to-use mixture: 1000 ppm (0.1%) .	Extraction (methanol + ammonium acetate) + HPLC	In polymers, textiles and coating.
Triclosan, CAS No.: 3380-34-5	Limit value: 30 ppm (0.003%) .	Extraction and GC-MS	In polymers and textiles.
Phenol, CAS No.: 108-95-2	In VOC test (48 hours) on final product, phenol's limit value: 10 µg/m ³	VOC tests according to ISO 16000-9 and ISO 16000-6	In latex and rubber.
Nitrosamine and N-nitrosatable substances	The total migration limit value: 0.01 ppm (0.000001%).	EN 12868	In latex, rubber and other thermoset elastomers.
Dimethyl formamide, CAS No.: 68-12-2	1000 ppm (0.1%) by weight of the solvent fraction.	EN ISO 11890-2	In coating.
<ul style="list-style-type: none"> • 2-ethoxy ethanol, CAS No.: 110-80-5 • 2-ethoxy ethylacetate, CAS No.: 111-15-9 	1000 ppm (0.1%) by weight of the solvent fraction.	EN ISO 11890-2	In coating.

<p>Aromatic hydrocarbon:</p> <ul style="list-style-type: none"> • Benzene, CAS No.: 71-43-2 • Toluene, CAS No.: 108-88-3 • Xylene, CAS No. (group): 1330-20-7 • Ethylbenzene, CAS No.: 100-41-4 • Styrene, CAS No.: 100-42-5 	<p>The content of total aromatic hydrocarbon solvents shall be less than 10000 ppm (1%) by weight in the liquid fraction of each surface coating component.</p> <p>Furthermore, the content of benzene (CAS no.: 71-43-2), shall be less than a limit of 1000 ppm (0.1%) by weight in the organic solvent fraction.</p>	<p>EN ISO 11890-2</p>	<p>In coating.</p>
<p>Chlorinated hydrocarbon:</p> <ul style="list-style-type: none"> • Methylene chloride, CAS No.: 75-09-2 • Chloroform, CAS No.: 67-66-3 • Perchloroethylene, CAS No.: 127-18-4 • Trichloroethylene, CAS No.: 79-01-6 • 1,1,1-trichloroethane, CAS No.: 71-55-6 	<p>Limit value for each listed substance: 10000 ppm (1%) .</p>	<p>Headspace gas Chromatography with electron capture detection (HSGC-ECD)</p>	<p>In coating.</p>
<p>Triaryl phosphates:</p> <ul style="list-style-type: none"> • Triphenyl phosphate, CAS No.: 115-86-6 • Tri-o-tolyl phosphate, CAS No.: 78-30-8 • Tri-m-cresyl phosphate, CAS No.: 563-04-2 • Tri-p-cresyl phosphate, CAS No.: 78-32-0 	<p>Limit value of each listed substance per litre of the aqueous simulant: 0.03 mg.</p>	<p>EN 71-10 and EN 71-11</p>	<p>In polymers, including plastics, silicone, and rubber/elastomers/ latex.</p>

6.2 Rare metal

Rare metal	Requirements of limit value (ppm = mg/kg)	Potential Uses
Copper (Cu)	Limit value: 1000 ppm (0.1%).	Solder, electric wire, printed circuit board (PCB), alloy

Gold (Au)	Limit value: 1000 ppm (0.1%).	Gold-plating, jewelry
Silver (Ag)	Limit value: 1000 ppm (0.1%).	Silver-plating, jewelry
Platinum (Pt)	Limit value: 1000 ppm (0.1%).	Jewelry, nib of fountain pen
Indium (In)	Limit value: 1000 ppm (0.1%).	ITO film
Tantalum (Ta)	Limit value: 1000 ppm (0.1%).	Capacitance, electrolyzation, rectifier, electrode of tube
Lithium (Li)	Limit value: 1000 ppm (0.1%).	Battery
Tellurium (Te)	Limit value: 1000 ppm (0.1%).	Metallurgical industry
Dysprosium (Dy)	Limit value: 1000 ppm (0.1%).	Magnet
Terbium (Tb)	Limit value: 1000 ppm (0.1%).	Magneto-optic disc, activating agent, magneto-optic galss, medical treatment
Neodymium (Nd)	Limit value: 1000 ppm (0.1%).	Neodymium glass, magnet
Lanthanum (La)	Limit value: 1000 ppm (0.1%).	Optical glass
Praseodymium (Pr)	Limit value: 1000 ppm (0.1%).	Ceramic material
Gadolinium (Gd)	Limit value: 1000 ppm (0.1%).	Magnetic refrigeration, medical treatment, atomic reactor
Erbium (Er)	Limit value: 1000 ppm (0.1%).	Erbium glass, ceramic, alloy
Ytterbium (Yb)	Limit value: 1000 ppm (0.1%).	Phosphate glass, laser materials
Yttrium (Y)	Limit value: 1000 ppm (0.1%).	Special glass and ceramic, the steel refining agent
Europium (Eu)	Limit value: 1000 ppm (0.1%).	Fluorescent powder, laser materials
Lutetium (Lu)	Limit value: 1000 ppm (0.1%).	Atomic energy industry
Samarium (Sm)	Limit value: 1000 ppm (0.1%).	Neutron absorber, photo- electric equipments, alloy

7 Requirements for conflict minerals

The conflict minerals originated in the Democratic Republic of Congo (DRC) or adjoining countries (Democratic Republic of Congo, Sudan, Uganda, Rwanda, Burundi, United Republic of Tanzania, Zambia, Angola, Central African Republic) can't be used. These minerals including but not limited to:

Substance	Reference standard and regulation
Tantalum (Ta)	H.R.4173
Tin (Sn)	
Gold (Au)	
Tungsten (W)	

8 Related document

- < RoHS environmental declaration >
- < Notice >
- < Declaration: Not use conflict minerals >
- < Packaging declaration of conformity >
- < ODS declaration of conformity >
- < Declaration of conformity D05-008 >
- < Questionnaire for environment-related substances >

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Appendix A: Exemptions list of EU RoHS directive

This list is for reference only, 2011/65/EU and it's amending documents shall prevail.

Exemption		Scope and dates of applicability
1	Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):	
1(a)	For general lighting purposes < 30W: 5mg	Expires on 31 December 2011; 3.5mg may be used per burner after 31 December 2011 until 31 December 2012; 2.5mg shall be used per burner after 31 December 2012
1(b)	For general lighting purposes \geq 30W and < 50W: 5mg	Expires on 31 December 2011; 3,5 mg may be used per burner after 31 December 2011
1(c)	For general lighting purposes \geq 50W and < 150W: 5mg	
1(d)	For general lighting purposes \geq 150W: 15mg	
1(e)	For general lighting purposes with circular or square structural shape and tube diameter \leq 17mm	No limitation of use until 31 December 2011; 7mg may be used per burner after 31 December 2011
1(f)	For special purposes: 5mg	
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 < 9mm (e.g. T2): 5mg	Expires on 31 December 2011; 4mg may be used per lamp after 31 December 2011
2(a) (2)	Tri-band phosphor with normal lifetime and a tube diameter \geq 9mm and \leq 17mm (e.g. T5): 5mg	Expires on 31 December 2011; 3mg may be used per lamp after 31 December 2011
2(a) (3)	Tri-band phosphor with normal lifetime and a tube diameter > 17mm and \leq 28mm (e.g. T8): 5mg	Expires on 31 December 2011; 3.5mg may be used per lamp after 31 December 2011
2(a) (4)	Tri-band phosphor with normal lifetime and a tube diameter > 28mm (e.g. T12): 5mg	Expires on 31 December 2012; 3.5mg may be used per lamp after 31 December 2012
2(a) (5)	Tri-band phosphor with long lifetime (\geq 25 000h): 8mg	Expires on 31 December 2011; 5mg 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 > 28mm (e.g. T10 and T12): 10mg	Expires on 13 April 2012
2(b) (2)	Non-linear halophosphate lamps (all diameters): 15mg	Expires on 13 April 2016
2(b) (3)	Non-linear tri-band phosphor lamps with tube diameter > 17mm (e.g. T9)	No limitation of use until 31 December 2011; 15mg 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; 15mg 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 ($\leq 500\text{mm}$)	No limitation of use until 31 December 2011; 3.5mg may be used per lamp after 31 December 2011
3(b)	Medium length ($> 500\text{mm}$ and $\leq 1500\text{mm}$)	No limitation of use until 31 December 2011; 5mg may be used per lamp after 31 December 2011
3(c)	Long length ($> 1500\text{mm}$)	No limitation of use until 31 December 2011; 13mg 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; 15mg 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 $R_a > 60$:	
4(b)- I	$P \leq 155\text{W}$	No limitation of use until 31 December 2011; 30mg may be used per burner after 31 December 2011
4(b)- II	$155\text{W} < P \leq 405\text{W}$	No limitation of use until 31 December 2011; 40mg may be used per burner after 31 December 2011
4(b)- III	$P > 405\text{W}$	No limitation of use until 31 December 2011; 40mg 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	$P \leq 155\text{W}$	No limitation of use until 31 December 2011; 25mg may be used per burner after 31 December 2011
4(c)- II	$155\text{W} < P \leq 405\text{W}$	No limitation of use until 31 December 2011; 30mg may be used per burner after 31 December 2011
4(c)- III	$P > 405\text{W}$	No limitation of use until 31 December 2011; 40mg 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)	<p>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:</p> <p>(a) 20mg per electrode pair + 0.3mg per tube length in cm, but not more than 80mg, for outdoor applications and indoor applications exposed to temperatures below 20°C;</p> <p>(b) 15 mg per electrode pair + 0.24mg per tube length in cm, but not more than 80mg, for all other indoor applications.</p>	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 125V AC or 250V DC or higher	
7(c)- III	Lead in dielectric ceramic in capacitors for a rated voltage of less than 125V AC or 250V 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 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
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) ₂ MgSi ₂ O 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 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 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 several hours at acoustic power levels of 125dB 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	
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 100dB (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 30mg 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 (< 10µg 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 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

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Appendix B: Arylamines

Substance		CAS No.
1	4,4'-Methylene bis-(2-chloroaniline)	101-14-4
2	4,4'-Diaminodiphenylmethane	101-77-9
3	4,4'-Oxydianiline	101-80-4
4	4-Chloroaniline	106-47-8
5	p-Toluidine	106-49-0
6	p-Phenylenediamine	106-50-03
7	m-Toluidine	108-44-1
8	o-Dianisidine	119-90-4
9	3,3'-Dimethylbiphenyl-4,4'-diamine	119-93-7
10	4-Methyl-2-aminoanisole	120-71-8
11	2,4,5-Trimethylaniline	137-17-7
12	4,4'-Thiobisbenzenamine	139-65-1
13	4-Methoxy-m-phenylenediamine	615-05-4
14	Aniline	62-53-3
15	4,4'-Methylene-bis(2-methylaniline)	838-88-0
16	2,6-Dimethylaniline	87-62-7
17	o-Anisidine	90-04-0
18	B-naphthylamine isopac	91-59-8
19	3,3-Dichlorobenzidine	91-94-1
20	4-Aminodiphenyl	92-67-1
21	Benzidine	92-87-5
22	o-Toluidine	95-53-4
23	2,4-Dimethylaniline	95-68-1
24	4-Chloro-2-methylaniline	95-69-2
25	2,4-Diaminotoluene	95-80-7
26	Fast Garnet GBC base	97-56-3
27	2-Methyl-5-nitroaniline	99-55-8

Appendix C: List of polycyclic aromatic hydrocarbons (PAH)

Sbstance		CAS No.
1	Acenaphthene	83-32-9
2	Acenaphthylene	208-96-8
3	Anthracene	120-12-7
4	Benzo(a)anthracene	56-55-3
5	Benzo(a)pyrene	50-32-8
6	Benzo(b)fluoranthene	205-99-2
7	Benzo(g,h,i)perylene	191-24-2
8	Benzo(k)fluoranthene	207-08-9
9	Chrysene	218-01-9
10	Dibenzo(a,h)anthracene	53-70-3
11	Fluoranthene	206-44-0
12	Fluorene	86-73-7
13	Indeno(1,2,3-cd)pyrene	193-39-5
14	Naphthalene	91-20-3
15	Phenanthrene	85-01-8
16	Pyrene	129-00-0
17	Benzo(j)fluoranthene	205-82-3
18	Benzo[e]pyrene	192-97-2

Appendix D: References

Related standards and terminology	Description
EU RoHS directive (2011/65/EU)	<p>2011/65/EU is a directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2011/65/EU is a recast directive for 2002/95/EC, it can be found at : http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32011L0065:en:NOT</p>
EU REACH regulation (No 1907/2006)	<p>No 1907/2006 is a regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals, it can be found at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006R1907:EN:NOT</p>
EU Battery directive (2006/66/EC)	<p>2006/66/EC set the heavy metal's concentration limit and mark requirements (Pb, Cd or Hg) on batteries and accumulators, it can be found at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006L0066:EN:NOT</p>
EU directive of packaging and packaging waste (94/62/EC)	<p>94/62/EC set the maximum concentration limits for the four heavy metals((lead, mercury, cadmium, hexavalent chromium) on packaging, it can be found at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31994L0062:en:NOT</p> <p>'Packaging' shall mean all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Non-returnable' items used for the same purposes shall also be considered to constitute packaging. 'Packaging' consists only of:</p> <ol style="list-style-type: none"> 1) Sales packaging or primary packaging, i.e. packaging conceived so as to constitute a sales unit to the final user or consumer at the point of purchase; 2) Grouped packaging or secondary packaging, i.e. packaging conceived so as to constitute at the point of purchase a grouping of a certain number of sales units whether the latter is sold as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting its characteristics; 3) Transport packaging or tertiary packaging, i.e. packaging conceived so as to facilitate handling and transport of a number of sales units or grouped packagings in order to prevent physical handling and transport damage. Transport packaging does not include road, rail, ship and air containers. <p>Packaging including: carton, wooden case, tray, blister box, plastic bag, bubble bag, foam, cord, adhesive tape, label, etc.</p>

<p>POPs directive (No 890/2004)</p>	<p>No 890/2004 is a directive on persistent organic pollutants, it can be found at : http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004R0850:EN:NOT</p>
<p>IEC 62321</p>	<p>International Electrotechnical Commission: Electrotechnical products - Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)</p>
<p>Montreal Protocol</p>	<p>Montreal Protocol, the full name is " Montreal Protocol on Substances that Depletethe Ozone Layer". This environmental protection protocol signed to protect the earth's Ozone Layer, come into valid on January 1,1989. It can be found at : http://ozone.unep.org/Publications/MP_Handbook/Section_1.1_Thw_Montreal_Protocol/</p>
<p>SVHC candidate list</p>	<p>'Candidate List of Substances of Very High Concern for authorisation' published by ECHA in accordance with REACH article 59 (10), it can be found at : http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp</p>
<p>SVHC proposal list</p>	<p>List of proposals for consultation concerning inclusion in the "SVHC candidate list", published under the heading of: 'Proposals to identify Substances of Very High Concern: Annex XV reports for commenting by Interested Parties' or equivalent. At time of publication of this proposal list, can be found at : http://echa.europa.eu/consultations/authorisation/svhc/svhc_cons_en.asp</p>
<p>CMR substances</p>	<p>Substances that according to CLP regulation (No 1272/2008) classification are :</p> <ul style="list-style-type: none"> • C: Carcinogenic substances classified as category 1A or 1B (risk phrases R45 or R49); • M: Mutagenic substances classified as category 1A or 1B (R46); • R: Substances toxic to reproduction ('repro-toxic') classified as category 1A or 1B (R60 or R61). <p>The list of these substance see the of CLP regulation (No 1272/2008) annex VI, it can be found at : http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008R1272:EN:NOT</p>

PBT substances	Substances that are Persistent (do not easily degrade in the environment) and Bioaccumulating (easily increase in concentration in living organisms, especially in fatty tissues) and Toxic, as defined in the EU REACH regulation (No1907/2006) Annex XIII.
vPvB substances	very Persistent and very Bioaccumulating substances, as defined in the EU REACH regulation (No1907/2006) Annex XIII.
Button cells	Small batteries shape like buttons, coins, beans, etc.
Skin-contact material Non-skin-contact material	For the determination of if the skin-contact requirement for PAH is applicable: 1) If the material with foreseeable skin contact for longer than 30 seconds (long-term skin contact) or repeated short-term skin contact, it is deemed a skin-contact material. 2) If the material with foreseeable skin contact less than 30 second (short term skin contact), it is deemed a non skin-contact material.
Persistent organic pollutants (POPs)	Persistent organic pollutants mean long residual, bioaccumulation, half volatile and highly toxic, can migrate long distances through a variety of environmental media (air, water, biological, etc.) , are serious harm to human health and the environment, are natural or synthetic organic pollutants.

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