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## **The Sony Ericsson Lists of Banned and Restricted Substances**

### **1 Purpose**

The purpose is to comply with the Sony Ericsson Environmental Quality Policy and to meet legislative and market requirements in the countries, where we sell products.

### **2 Directive**

The lists contained in this document specify the chemical substances that are banned or restricted for the use in certain circumstances in Sony Ericsson's products and manufacturing operations. Suppliers to Sony Ericsson, have to comply with the requirements laid down in this directive, with regard to those components and products supplied to Sony Ericsson.

Sony Ericsson will work with its suppliers to eliminate such substances in procured material.

The substances in question are categorized in two classes, namely banned substances and restricted substances

- Banned substances are prohibited from being added to our products, even in low concentrations,
- Restricted substances may be used only under very limited conditions and are generally targeted for elimination and shall be phased out as soon as possible and replaced with technically and economically acceptable alternatives.

The ban or restriction does not apply in any case where such a presence derives from natural impurities, that is, an undesired presence in very small concentrations.

### **3 Application**

Sony Ericsson's suppliers, vendors and manufacturing partners are responsible for implementing their respective part of these requirements and guidelines. Within Sony Ericsson all relevant functions such as product management, product design functions, research and development, industrialization, sourcing, CTO office and manufacturing & supply chain management functions shall internally implement their respective part of these requirements and guidelines.

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## The Sony Ericsson list of banned substances (in products)

Group of substances	Banned Substance	CAS-number	Examples of main areas of use	Main risks	Maximum Concentration Value <sup>1</sup>
Metals and their compounds	Cadmium and its compounds	Various	Stabilizers or pigments in plastics, ceramics in capacitors, batteries	Toxic	Plastics, inks, paints, textiles, rubber and resins: 5 ppm Others: 100 ppm
	Chromium (VI) compounds	Various	Corrosion inhibitors, pigments in plastics and inks, leather tanning	Allergenic, carcinogenic	Leather and textiles: 10 ppm Others: 1000 ppm
	Lead and its compounds	Various	Plastics, printing inks, solders, surface finishes	Bioaccumulative	Plastics, inks, paints, textiles, rubber and resins: 100 ppm Others: 1000 ppm
	Mercury and its compounds	Various	Batteries	Toxic	Plastics, inks, paints, textiles, rubber and resins: 5 ppm Others: 1000 ppm
	Antimony and its compounds Application: See section 4.	Various	Flame retardants, electronic components, LCD:s	Toxic, negative for recycling	1000 ppm
	Beryllium, beryllium alloys and beryllium compounds Application: See section 4.	Various	Connectors	Carcinogenic	1000 ppm
	Nickel, nickel alloys except in steel alloys and nickel compounds. Application: See section 4.	Various	Decorative metal finishes, barrier layers	Allergenic	See section 4.
Halogenated flame retardants	All halogenated flame retardants, including <ul style="list-style-type: none"> <li>▪ Polybrominated biphenyls (PBBs),</li> <li>▪ Polybrominated diphenylethers (PBDEs)</li> <li>▪ Tetrabromobisphenol-A (TBBA, TBBPA) and</li> <li>▪ Hexabromo cyclododecane (HBCDD).</li> </ul> Application: See section 4.	Various	Printed boards, plastics, textiles	Bioaccumulative Ecotoxic	See section 4.
Polymers	All chlorinated polymers including polyvinylchloride (PVC), PVC blends and Chloroprene Rubber	Various	Packaging, cables, glues, electronic and mechanical equipment	Corrosion and/or risk of formation of chlorinated dibenzodioxins and furans at uncontrolled fire	900 ppm
	Synthetic and natural Latex Rubber	Various	Covers, rubber, soft materials	Allergenic	N/A

<sup>1</sup> For more details on Maximum Concentration Values, please refer to section 4 in this document.



Plasticizers	All Phthalates	Various	Plastics, mainly Polyvinylchloride (PVC)	Bioaccumulative, Ecotoxic	1000 ppm
Chlorinated hydrocarbons	Chloroparaffins (C10-C13; Cl > 50 weight %)	63449-39-8	Lubricants, plasticizers, flame retardants	Bioaccumulative	1000 ppm
	Chloroparaffins (C14-C17; Cl>50 weight %)	85535-85-9			
	Hexachlorobenzene	118-74-1	Pigment feedstock	Carcinogenic	1000 ppm
	Polychlorinated biphenyls (PCBs)	1336-36-3	Lubricants, oils for capacitors	Bioaccumulative	50 ppm
	Polychlorinated naphtalenes (PCNs)	70776-03-3	Lubricants, preservatives		
	Polychlorinated terphenyls (PCTs)	61788-33-8			
Other organic compounds	Azocolorants that can decompose to carcinogenic aromatic amines and azodyes listed in EU directives 2002/61/EC and 2003/3/EC. Applicable only when in direct and prolonged skin contact.	Various	Plastics, textiles and leather	Carcinogenic	30 ppm
	Formaldehyde	50-00-0	Textiles, leather, wood preservatives		Maximum emission rate: 0.1 ml/m <sup>3</sup>
	Organic tin compounds (Tributyl tin and triphenyl tin Compounds)	Various	Stabilizers in plastics and printing inks	Toxic	1000 ppm
	Perfluoro Octane Sulfonates (PFOS)	Various	Metal plating, LCDs	Bioaccumulative, Ecotoxic	1000 ppm
	Bisphenol-A (BPA)	80-05-7	Production of Polycarbonate Plastics, Epoxy	Endocrine disruptor, toxic	50 ppm
Other inorganic compounds	Asbestos	Various	Insulators	Carcinogenic	100 ppm
Other materials	Materials originated from tropical forests, endangered species or species under the threat of extermination	N/A	Packaging materials, decorative items	N/A	N/A



**The Sony Ericsson list of banned substances (in production)**

Group of substances	Banned Substance	CAS-number	Examples of main areas of use	Main risk
Halogenated hydrocarbons	Chlorofluorocarbons (CFCs)	Various	Solvents and refrigerants	Ozone depletion
	Chloroflourohydrocarbons (HCFCs)	Various		
	Halon-1211, Halon-1301, Halon-2402	Various		
	Methyl bromide. Not applicable for certain regulated quarantine and pre-shipment purposes.	74-83-9	Pesticide	
	Carbon tetrachloride	56-23-5	Solvents	
	Chlorobromomethane	74-97-5		
	n-bromopropane	106-94-5		
	1.1.1-trichloroethane	71-55-6		
	Methylene chloride (dichloro methane)	75-09-2		
	Tetrachloroethylene (Perchloroethylene)	127-18-4		
	Trichloroethylene	79-01-6		
	Trichlorobenzene	120-82-1		
Other organic compounds	Nonylphenol	25154-52-3	Surfactants	Bioaccumulative
	Nonylphenolpolyglycoethers (Nonylphenoethoxylates)	9016-45-9		

### The Sony Ericsson list of restricted substances (in products)

Group of substances	Restricted Substance	CAS-number	Examples of main areas of use	Main risks	Phase out date
Other inorganic compounds	Perchlorates	Various	Primary Li/MnO <sub>2</sub> (CR) batteries	Disruption of hormone production	TBD
	Cobalt Dichloride	7646-79-9	Moisture sensitive agent, Silica gel bags	Carcinogenic	-
Other organic compounds	2-benzotriazole-2-yl-4,6-ditert-butyl-phenol	3846-71-7	UV Coating	Toxic, Bioaccumulative	1 January 2009

### The Sony Ericsson list of restricted substances (in production)

Group of substances	Restricted Substance	CAS-number	Main area of use	Main risk
Halogenated hydrocarbons	Fluorocarbons (FCs)	Various	Refrigerants	Global warming potential
	Fluorohydrocarbons (HFCs) except refrigerants	Various	Solvents	

## 4 Comments

### 4.1 General information

**Homogenous material:** The definition of a homogenous material is a material of uniform composition that can not be mechanically disjointed into different materials, i.e. the materials can not be separated by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes.

**Phase-out date:** The date when a substance must not be used in new products based on new electrical platforms.

**Definition of products and production:** Under each banned and restricted list, two classes of substances exist, namely substances in products and substances in production. These are defined as;

- A product is an object with a certain shape, surface, design or function, where the substances that build up this object are requisites for determining its shape, surface, design or function.
- Production is the manufacturing of a product. The substances used in production are only aids during production to obtain the final shape, surface, design or function of the product.

**Substances banned in production:** For substances banned in production no Maximum Concentration Value (MCV) limits can be applied, since the amount of the banned substance in a product does not reflect the amount of the same substance used in production. Hence, the MCV limit applied for banned substances in production is 0 mg/kg (ppm), when measured in products.

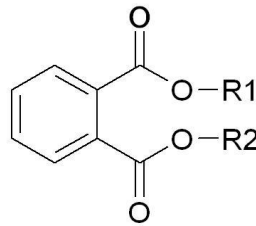
**Nickel and nickel compounds:** No parts on or areas of Sony Ericsson products shall be treated with nickel based surface treatments (such as nickel – chromium plating), where these parts might be in direct and prolonged skin contact of the end user of that product. This requirement is valid on all new product launches.

**Halogenated Flame Retardants:** All halogenated flame retardants are banned to be used in Sony Ericsson products including, but not limited to plastics, printed circuit boards and all other electrical or electromechanical components. Exempted uses are described in section 4.3 of this document.

Halogenated flame retardants are defined as organic compounds containing the halogens bromine and/or chlorine, and are generally used in applications as flame retardants. The ban is applicable on halogenated flame retardants used either as additives or as reactives (i.e. co-polymerized compounds).



**Phthalates:** All phthalates based on esters of ortho-phthalic acid (*Figure 1*) are banned in Sony Ericsson products. There are several different phthalates based on ortho-phthalic acid.



**Figure 1.** Ester of ortho-phthalic acid, where R1 and R2 are usually aliphatic side chains.

## 4.2 Maximum Concentration Values (MCV)

The specified Maximum Concentration Values are the highest amounts of specified substances that are allowed in materials and components intended to be released in products under the brand name of Sony Ericsson.

For packaging materials and for batteries, certain special provisions also apply regarding Cadmium, Mercury, Lead and Chromium.

### 4.2.1 MCV Values for components and products

**Cadmium and its compounds:** The acceptable MCV in each homogeneous material is 5 mg/kg (ppm) for plastics, inks, paints, textiles, rubber and resins and 100 mg/kg (ppm) for all other materials. Special requirements are valid for packaging materials and batteries.

**Chromium (VI) compounds:** The acceptable MCV in each homogeneous material is 10 mg/kg (ppm) for leather and textiles and 1000 mg/kg (ppm) for all other materials. Special requirements are valid for packaging materials and batteries.

**Lead and its compounds:** The acceptable MCV in each homogeneous material is 100 (ppm) for plastics, inks, paints, textiles, rubber and resins and 1000 mg/kg (ppm) for all other materials. Special requirements are valid for packaging materials and batteries.

**Mercury and its compounds:** The acceptable MCV in each homogeneous material is 5 mg/kg (ppm) for plastics, inks, paints, textiles, rubber and resins and 1000 mg/kg (ppm) for all other materials. Special requirements are valid for packaging materials and batteries.

**Antimony and its compounds:** The acceptable MCV in each homogenous material is 1000 mg/kg (ppm).

**Beryllium, beryllium alloys and beryllium compounds:** The acceptable MCV for each homogenous material is 1000 mg/kg (ppm).

**Nickel and nickel compounds:** No nickel or nickel compounds shall be detected on surface parts in direct and prolonged skin contact of the end user.



**Halogenated flame retardants:** The ban is applicable to chlorinated and brominated flame retardants, i.e. organic compounds containing chlorine and/or bromine.

The acceptable MCV in each homogenous material in prepared components shall be;

- 900 mg/kg (ppm) bromine, when solely bromine exists in the homogenous material.
- 900 mg/kg (ppm) chlorine, when solely chlorine exists in the homogenous material.
- 900 mg/kg (ppm) bromine and chlorine, when bromine and chlorine are found together in the homogenous material.

**Chlorinated polymers (including PVC and Chloroprene rubber):** The acceptable MCV of chlorinated polymers is 900 mg/kg (ppm).

**Synthetic and natural Latex rubber:** The ban is applicable for surfaces when in direct and prolonged skin contact with the end user. No Latex rubber shall be detected when analyzed.

**Phthalates:** The acceptable MCV for phthalates is 1000 mg/kg (ppm).

**Chloroparaffins (C10-C13 and C14-C17):** The acceptable MCV for Chloroparaffins is 1000 mg/kg (ppm).

**Hexachlorobenzene:** The acceptable MCV for Hexachlorobenzene is 1000 mg/kg (ppm).

**Polychlorinated biphenyls, polychlorinated naphthalenes and polychlorinated tephnyls:** The acceptable MCV for Polychlorinated biphenyls, polychlorinated naphthalenes and polychlorinated tephnyls is 50 mg/kg (ppm).

**Azocolorants that can decompose to carcinogenic aromatic amines:** The acceptable MCVs in each textile or leather article of the listed aromatic amines and azodyes in the EU directive 2003/3/EC are 30 mg/kg (30 ppm) for all except CAS No 118685-33-9 where 1000 mg/kg (1000 ppm) is applicable.

**Formaldehyde:** In general, the limit value for formaldehyde emission is 0.1 ml/m<sup>3</sup>. For textiles and leather the acceptable MCVs in each article are 30 mg/kg (30 ppm) in direct and 300 mg/kg (300 ppm) not in direct skin contact respectively.

**Tributyl tin and triphenyl tin compounds:** The acceptable MCV for organotin compounds is 1000 mg/kg (ppm).

**Perfluoro Octane Sulfonates:** The acceptable MCV in each homogenous material is 1000 mg/kg (ppm).

**Bisphenol-A (BPA):** The acceptable MCV of unreacted monomer residues of BPA in polycarbonate plastics and epoxy is 50 mg/kg (ppm).

**Asbestos:** The acceptable MCV for asbestos is 100 mg/kg (ppm).



#### 4.2.2 MCV Values for Cadmium, Mercury, Lead and Hexavalent Chromium in Packaging Materials

**Packaging:** The acceptable sum concentration of cadmium, mercury, lead and hexavalent chromium in each packaging component is 100 mg/kg (ppm). In each cured printing ink the acceptable MCV of cadmium and lead must not exceed 5 mg/kg (5 ppm) and 100 mg/kg (100 ppm) respectively.

#### 4.2.3 MCV Values for Cadmium, Mercury and Lead in Batteries

**Batteries:** The acceptable sum concentration of specified substances in each battery is;

- 20 mg/kg (ppm) Cadmium
- 1 mg/kg (ppm) Mercury, except for button cells that may contain no more than 2 % mercury by weight.
- 40 mg/kg (ppm) Lead

#### 4.3 Exempted uses

**General exemptions to bans on Antimony, Beryllium and some applications of halogenated flame retardants:** Products based on electrical platforms, where the electrical platforms were placed on the market before 1 January 2008, may continue to use, even though substitution should be considered:

- Antimony and its compounds,
- Beryllium, beryllium alloys and beryllium compounds, except Beryllium Oxide
- Halogenated flame retardants in the epoxy resin of the adhesive for dynamic Flexible Printed Circuit boards under mechanical stress and halogenated flame retardants in the epoxy resin of molds and substrates for electrical components.

**Cadmium and its compounds:** Cadmium in optical and filter glass is exempted.

**Lead and its compounds:** Lead and its compounds in the following applications are exempted:

- in glass of electronic components
- as an alloying element in steel up to 0.35 % lead by weight, in aluminum up to 0.4 % lead by weight and in a copper alloy up to 4 % lead by weight
- in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)
- in electronic ceramic parts
- in compliant pin connector systems
- in optical and filter glass
- 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
- in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages
- as an impurity/an alloying element in all other metals and alloys up to 0.1 % lead by weight



**Antimony and its compounds:** Antimony is generally accepted in:

- Solder alloys up to 2 % by weight

**Nickel and nickel compounds:** Exempted from the ban on nickel and nickel compounds in surfaces that might be in direct and prolonged skin contact with the end user, is

- Nickel in steel alloys.

**Perfluoro Octane Sulfonates:** Exempted from the ban, are the following uses of PFOS:

- Photoresists or anti reflective coatings for photolithography processes
- Mist suppressants for non-decorative hard chromium (VI) plating and wetting agents for use in controlled electroplating systems where the amount of PFOS released into the environment is minimised, by fully applying relevant best available techniques developed within the framework of Council Directive 96/61/EC.



## 5 Changes since last revision

<p><b>General</b></p>	<ol style="list-style-type: none"> <li>1. Added: <b>Suppliers to Sony Ericsson, have to comply with the requirements laid down in this directive, with regard to those components and products supplied to Sony Ericsson.</b> Under Section 2, Directive.</li> <li>2. Added: Within Sony Ericsson <b>all relevant functions such as product management, product design functions, research and development, industrialization...</b></li> <li>2. Changed: Section 4 has been divided into three subcategories (<b>General Information, Maximum Concentration Values (MCV) and Exempted uses</b>).</li> </ol>
<p><b>Banned substances in products</b></p>	<ol style="list-style-type: none"> <li>1. Added: <b>“Examples of Main areas of use”</b> in table heading.</li> <li>2. Added: <b>Textiles</b> under Maximum Concentration Value column.</li> <li>3. Changed: MCV of Chlorinated Polymers, from 1000 ppm to 900 ppm.</li> <li>4. Added/Changed: <b>Hexabromo cyclododecane (HBCDD)</b> under Halogenated Flame Retardants.</li> <li>5. Added/Changed: <b>“All Phthalates”</b>, under Plasticizers.</li> <li>6. Added: <b>Perfluoro Octane Sulfonate</b> under Other organic compounds.</li> <li>7. Added: <b>Bisphenol-A (BPA)</b> under Other organic compounds.</li> </ol>
<p><b>Banned substances in production</b></p>	<ol style="list-style-type: none"> <li>1. Deleted: <b>Perfluoro Octane Sulfonate</b> under Halogenated Hydrocarbons.</li> </ol>
<p><b>Restricted substances in products</b></p>	<ol style="list-style-type: none"> <li>1. Added: <b>Cobalt dichloride</b> under Other inorganic compounds.</li> <li>2. Added: <b>Other organic compounds</b> row.</li> <li>3. Added: <b>2-benzotriazole-2-yl-4,6-ditert-butyl-phenol</b> under Other organic compounds.</li> </ol>
<p><b>Restricted substances in production</b></p>	<p>No Changes since last revision.</p>
<p><b>Comments</b></p>	<ol style="list-style-type: none"> <li>1. Changed: Layout of Section 4, where three subsections have been introduced. Corresponding texts from previous revision have merged into these subsections.</li> <li>2. Added: Subsections <b>General Information, Maximum Concentration Values</b> and <b>Exempted Uses</b>.</li> <li>3. Added: Homogenous materials definition, under General Information.</li> <li>4. Added: Definition of <b>products</b> and <b>production</b>.</li> <li>5. Added/Changed: Nickel and nickel compounds, under General Information, to reflect the Sony Ericsson ban on nickel in surface treatments.</li> <li>6. Added: Definition on banned phthalates, under General Information.</li> </ol>



7. Added: Under Section 4.2 **“The specified Maximum Concentration Values are the highest amounts of specified substances that are allowed in materials and components intended to be released in products under the brand name of Sony Ericsson. For packaging materials and for batteries, certain special provisions apply regarding Cadmium, Mercury, Lead and Chromium.”**
8. Added/Changed: Definition and MCV of banned halogenated flame retardants under section 4.2.1.
9. Changed: MCV for Chlorinated Polymers from 1000 ppm to 900 ppm.
10. Added: MCV and definition for Bisphenol-A under section 4.2.1.
11. Added/Changed: Subsection 4.2.2 on MCV in packaging materials.
12. Added: Subsection 4.2.3 on MCV in batteries.
13. Added: Latex rubber MCV.
14. Added: PFOS MCV.
15. Deleted: **when bound in a ceramic matrix in some electronic components** under Antimony and its compounds under Exempted uses.
16. Added: Exemptions for Nickel in surfaces.
17. Added: Exemptions for PFOS.