

The Ericsson Lists of Banned and Restricted Substances

WORKING INSTRUCTIONS

Abstract

This document identifies substances and materials which use is restricted or under observation in products and manufacturing processes.

Purpose

The purpose of The Ericsson Lists of Banned and Restricted Substances is that Ericsson is in compliance with its environmental policy, existing and anticipated environmental legislation and relevant market requirements.

Application

The lists are applicable in the design phase, at purchasing and in manufacturing of components and products, including batteries and packaging. They shall be applied globally.

Contents

1	Introduction.....	2
1.1	Banned and restricted substances	3
1.2	Substances under Observation	3
1.3	Definitions	3
2	The Ericsson Lists of Banned and Restricted Substances	4
2.1	List of Banned and Restricted Substances - in products	4
	List of Banned and Restricted Substances - in products.....	5
2.2	List of Substances under Observation - in products	6
2.3	List of Banned and Restricted Substances - in production	7
2.4	List of Substances under Observation - in production	8
3	Further information	9
3.1	Special requirements for batteries and accumulators.....	9
3.2	Special requirements for packaging	9
3.3	Cadmium and its compounds	9
3.4	Chromium (VI) compounds.....	9
3.5	Lead and its compounds.....	10
3.6	Mercury.....	11
3.7	Formaldehyde.....	11
3.8	Perfluoro Octane Sulfonates, PFOS.....	11
3.9	Methyl bromide	12
3.10	Nonylphenol ethoxylate	12
4	Change information.....	13

1 Introduction

This document contains restricted substances and materials. The identified substances are classified as either “Banned and Restricted substances” or “Substances under Observation”.

The substances are restricted or under observation for use in:

- Components, parts and finalized products.
- Packaging.
- Batteries.
- Manufacturing processes.

1.1 Banned and restricted substances

- Shall not be intentionally added to products, components or parts purchased or designed by Ericsson in accordance with specifications in the list.
- Shall not be used in manufacturing processes of our products. In case local or regional legislation goes beyond these requirements, that legislation shall also be complied with.

Exempted applications of Banned and Restricted Substances are found in section 3, Further information.

1.2 Substances under Observation

- Shall be substituted when alternatives that are technically, economically and environmentally feasible are available.

These substances are identified as having hazardous properties and therefore the use in Ericsson products and manufacturing processes cause concern.

1.3 Definitions

Substances in products are substances that if used will become a part of the final Ericsson product.

Substances in production are substances used as intermediates or as an aid during the production of products, components or parts.

2 The Ericsson Lists of Banned and Restricted Substances

2.1 List of Banned and Restricted Substances - in products

Group of substances	Restricted substance	CAS no	Banned application	Example of use	Main risk
Metals and their compounds	Arsenic and its compounds ¹	Several	As wood preservative	Wood preservation	Toxic
	Cadmium and its compounds	Several	All applications, see section 3.3 for exemptions	Stabilizer and colouring in plastics, ceramic capacitors, surface coating	Toxic
	Cobalt dichloride	7646-79-9	All applications	Humid indicator strips	Carcinogenic
	Chromium(VI) compounds	Several	All applications, see section 3.4 for exemptions	Corrosion inhibitors, pigments in plastic and ink	Allergenic, carcinogenic
	Lead and its compounds	Several	In packaging, paint and electronics, see section 3.5 for exemptions	Soldering, printing inks, plastics, surface finish	Bio accumulative
	Mercury and its compounds	Several	All applications, see section 3.6 for exemptions	Electronic equipment, batteries	Toxic
	Nickel and its alloys except in steel alloys	Several	In parts that during use will be in direct and prolonged skin contact	Electronic equipment	Allergenic
Halogenated flame retardants	PBB – Polybrominated biphenyls	Several	All applications	Flame retardants in plastics and printed boards	Bio accumulative
	PBDE - Polybrominated diphenylethers (including deca-BDE)	Several	All applications	Flame retardants in plastics and printed boards	Bio accumulative
Chlorofluoro carbons	CFCs – Chlorofluorocarbons	Several	All applications	Refrigerants, solvents	Ozone depletion
	HCFCs – Hydrochlorofluorocarbons	Several	All applications	Refrigerants, solvents	Ozone depletion
	Halons	Several	All applications	Fire extinguisher	Ozone depletion

¹ Note: Does not apply to GaAs in semiconductors

List of Banned and Restricted Substances - in products

Group of substances	Restricted substance	CAS no	Banned application	Example of use	Main risk
Chlorinated hydrocarbons	Polychlorinated biphenyls (PCB)	Several	All applications	Lubricant, oil for capacitors, sealant in concrete	Bio accumulative
	Polychlorinated terphenyls (PCT)	Several	All applications	Lubricant, preservative	Bio accumulative
	Polychlorinated naphthalenes (PCN)	Several	All applications	Lubricant, preservative	Bio accumulative
	Short chained chlorinated paraffins (C10-C13)	63449-39-8 85535-84-8 85535-85-9	All applications	Lubricants, plasticisers, flame-retardant	Bio accumulative
Other organic compounds	Azo-dyes that can decompose to carcinogenic aromatic amines	Several	All applications	Colouring of plastics	Decompose to carcinogenic aromatic amines
	Creosotes	Several	All applications	Wood preservation	Toxic
	Dimethyl (E)-butenedioate (dimethylfumarate or DMF)	624-49-7	All applications	In desiccant bags as mould protection.	Allergenic
	Formaldehyde	50-00-0	Preservative in wood panels, see section 3.7 for details	Glue in plywood panels	Allergenic
	2-benzotriazole-2-yl-4,6-ditert-butyl-phenol	3846-71-7	All applications	In paint and plastics	Toxic, Bio accumulative
	Tributyl tin compounds	Several	All applications	In paint	Toxic
	Triphenyl tin compounds	Several	All applications	In paint	Toxic
	Perfluoro octane sulfonates (PFOS)	Several	All applications, see section 3.8 for exemptions	In semiconductors, photolithographic processes	Bio accumulative Eco toxic
Other inorganic compounds	Asbestos	1332-21-4	All applications	Insulation material	Carcinogenic
Other materials	Material, originated from tropical forests, endangered species or species under the threat of extermination	N/A	All packaging material and packaging types	Loading pallets, cases and boxes	N/A

2.2 List of Substances under Observation - in products

Group of substances	Substance under Observation	CAS no	Example of use	Main risk
Metals and compounds	Antimony and its compounds	Several	Flame retardant in PVC cables	Toxic
	Beryllium and its compounds	Several	BeO: High power applications Beryllium copper alloys: Connectors	BeO: carcinogenic Alloys: Forming of BeO at recycling
	Bismuth and its compounds	Several	Surface finish, additive in solders	Negative for recycling
Halogenated flame retardants	All other halogenated flame retardants including: <ul style="list-style-type: none"> Hexabromocyclododecane -HBCDD and its diastereoisomers Tetrabromobisphenol A (TBBPA) 	Several	Flame retardant	Bio accumulative, toxic
		25637-99-4		
		79-94-7		
Chlorinated hydrocarbons	Medium chained chlorinated paraffins (C14-C17)	Several	Flame retardant, plasticizer	Eco toxic
	Chlorinated polymers	Several	Cables	Formation of toxic dioxins and furans at uncontrolled End of Life treatment
Other organic compounds	4,4'-Isopropylidendiphenol (Bisphenol A)	80-05-7	Polymer additive and rest at production of polycarbonates	Toxic
	4,4'-Diaminodiphenylmethane (MDA)	101-77-9	Hardener in epoxy resins and adhesives (on-site intermediate)	Carcinogenic
	Phthalates including i.e.: <ul style="list-style-type: none"> Bis(2-ethylhexyl)phthalate (DEHP) Dibutyl phthalate (DBP) Benzyl butyl phthalate (BBP) All other phthalates 	Several	Plasticisers	Toxic to reproduction
		117-81-7		
		84-74-2		
	85-68-7	Several	Plasticisers	Can be toxic or carcinogenic
Polycyclic Aromatic Hydrocarbons (PAH) (classified CMR cat 1 or 2)	Several	Plasticizers in cables	Carcinogenic	
Other inorganic compounds	Perchlorate	Several	Li/MNO ₂ Batteries	Disruption of hormone production
Radioactive substances	All radioactive substances	Several	Spark gap and over voltage protection	Carcinogenic

2.3 List of Banned and Restricted Substances - in production

Group of substances	Restricted substance	CAS no	Banned application	Example of use	Main risk
Metals and compounds	Chromium (VI) in cement	N/A	Specification in section 3.4.	Occurs naturally in cement	Allergenic Carcinogenic
Halogenated hydrocarbons	Chlorofluorocarbons (CFC)	Several	All applications	Refrigerants, solvents	Ozone depletion
	Hydrochlorofluorocarbons (HCFC)	Several	All applications	Refrigerants, solvents	Ozone depletion
	Halons	Several	All applications	Fire extinguisher	Ozone depletion
	Bromochloromethane	74-97-5	All applications	Solvents	Ozone depletion
	Carbon tetrachloride	56-23-5	All applications	Solvents	Ozone depletion
	Methyl bromide	74-83-9	All applications, see section 3.9 for exemptions	Pesticide in wood treatment	Ozone depletion Mutagenic
	Methylene chloride	75-09-2	All applications	Solvent	Carcinogenic
	n-bromopropane	106-94-5	All applications	Solvent	Ozone depletion
	Tetrachloroethylene	127-18-4	All applications	Solvent	Carcinogenic
	1.1.1-trichloroethane	71-55-6	All applications	Solvent	Ozone depletion
	Trichloroethylene	79-01-6	All applications	Solvent	Carcinogenic
	Trichlorobenzene	120-82-1	All applications	Solvent	Persistent, bio accumulative
Other organic compounds	Perfluoro octane sulfonates (PFOS)	Several	All applications, see section 3.8 for exemptions	Plating of metals	Bio accumulative, ecotoxic
	Nonylphenol	25154-52-3	All applications, see section 3.10 for exemptions	Surfactant in cleaning agents	Bio accumulative
	Nonylphenol ethoxylate (Nonylphenolpolyglycoethers)	9016-45-9	All applications, see section 3.10 for exemptions	Surfactant in cleaning agents	Bio accumulative

2.4 List of Substances under Observation - in production

Group of substances	Substance under Observation	CAS no	Main area of use	Main risk
Metals and compounds	Sodium dichromate	10588-01-9 7789-12-0	Hot dip galvanization	Carcinogenic, mutagenic and toxic to reproduction
Halogenated hydrocarbons	Fluorocarbons (FC)	Several	Solvents, refrigerants	Global warming
	Fluorohydrocarbons (HFC)	Several	Solvents, refrigerants	Global warming
Other organic compounds	Aromatic amines	Several	Solvents	Carcinogenic
	Isocyanates	Several	Glue	Allergenic, carcinogenic, toxic
	Perfluorooctanoic acid and its salts (PFOA)	Several	Intermediate, production of fluoropolymers	Persistent, suspected carcinogenic
Green-house gases	Nitrogen trifluoride	7783-54-2	Plasma etching	Global warming
	Sulfur hexafluoride, SF6	2551-62-4	Magnesium die-casting Plasma etching, cleaning	Global warming

3 Further information

This section contains further details concerning restrictions and applicable exemptions. If a legal exemption is withdrawn in applicable legislation Ericsson will in due time update this list in time for the finalized product to be compliant.

3.1 Special requirements for batteries and accumulators

The acceptable concentration of specified substances in each battery is:

- cadmium - 0,002 % by weight
- mercury – 0,005 % by weight except for button cells that may contain no more than 2 % mercury by weight
- lead - 0.4% by weight.

3.2 Special requirements for packaging

Acceptable concentration levels for substances are as specified in Directive 1994/62/EC with amendments.

3.3 Cadmium and its compounds

Exempted is the use of:

- cadmium in optical and filter glass.

Reference: Directive 2002/95/EC

Note: Acceptable concentration levels for packaging material and batteries are found in section 3.1 and 3.2.

3.4 Chromium (VI) compounds

Note: Acceptable concentration levels for packaging material and batteries are found in section 3.1 and 3.2.

3.4.1 In products – non electrical and electronic products

Exempted is the use of chromium (VI) containing compounds:

- as surface treatment for non electrical and electronic products.

Note: This use is under observation and the use should be substituted if technically, environmentally and economically alternatives are available.

3.4.2 In production - Cement

Cement and cement-containing preparations shall not be used if they contain, when hydrated, more than 0,0002 % soluble chromium (VI) of the total dry weight of cement.

Exempted from the requirement to reduce the level of chromium (VI) is:

- for cement used in controlled, closed and totally automated processes where the cement and cement-containing preparations are handled solely by machines and in which there is no possibility of contact with the skin.

Note: Chromium (VI) is naturally occurring in cement and the content need to be actively reduced.

3.5 Lead and its compounds

The following uses of lead are exempted:

- lead in glass of electronic components
- lead 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
- lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)
- lead in electronic ceramic parts
- lead in compliant pin connector systems
- lead in optical and filter glass
- 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
- lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages
- lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunication.

Reference: Directive 2002/95/EC

Note: Ericsson takes a restrictive standpoint towards use of the exemption for lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunication.

In exceptional cases, for specific components or part, when Ericsson need to use this exemption suppliers will be informed. In the case that a supplier needs to use this exemption a phase-out plan shall be communicated and agreed upon with Ericsson.

Note: Acceptable concentration levels for packaging material and batteries are found in section 3.1 and 3.2.

3.6 Mercury

The following uses of mercury are exempted:

- mercury in compact fluorescent lamps not exceeding 5 mg per lamp
- mercury in straight fluorescent lamps for general purposes not exceeding
- halophosphate 10 mg
- triphosphate with normal lifetime 5 mg
- triphosphate with long lifetime 8 mg
- mercury in straight fluorescent lamps for special purposes
- mercury in other lamps not specifically mentioned in the list of exemptions to directive 2002/95/EC.

Reference: Directive 2002/95/EC

Note: Acceptable concentration levels for packaging material and batteries are found in section 3.1 and 3.2.

3.7 Formaldehyde

Formaldehyde as a rest product from the plywood production process may not exceed the limit E1 when tested according to gas analysis EN 717-2.

3.8 Perfluoro Octane Sulfonates, PFOS

Exempted uses of PFOS are as:

- 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 minimized, by fully applying relevant best available techniques developed within the framework of EC Council Directive 96/61/EC.

Note: The restrictions of perfluorooctane sulfonates (PFOS) includes substances with the formula $C_8F_{17}SO_2X$, where X can be an OH-group, a metal salt (O-M+), halide, amide, or other derivatives including polymers.

3.9 Methyl bromide

Exempted from the ban on methyl bromide is for use in:

- certain regulated quarantine and pre-shipment applications until 2015.

Reference: Montreal Protocol on Substances that Deplete the Ozone Layer.

3.10 Nonylphenol ethoxylate

Exempted use of nonylphenol ethoxylates is:

- in industrial and institutional cleaning systems with special treatment where the washing liquid is recycled or incinerated
- in industrial and institutional cleaning in controlled closed dry cleaning systems where the washing liquid is recycled or incinerated.

Note: This restriction covers both nonylphenol ($C_6H_4(OH)C_9H_{19}$) and nonylphenol ethoxylates ($(C_2H_4O)_n C_{15}H_{24}O$).

4 Change information

- 1 Introduction
 - 1.1 Added: Introduction
 - 1.2 Changed: Banned and restricted substances and Substances under Observation.
 - 1.3 Added: Definitions for in products and in production.
- 2 Restricted substances in products
 - 2.1 Deleted: Column with "Principal legislation"
 - 2.2 Added: Column with CAS no
 - 2.3 Added: Note: Does not apply to GaAs in semiconductors.
 - 2.4 Added: For Cadmium and its compounds: All applications.
 - 2.5 Added: Cobalt dichloride
 - 2.6 Added: ..paint and electronics. as applications for Chromium (VI) compounds
 - 2.7 Added: For Lead and its compounds:in electronics.
 - 2.8 Moved: Nickel and its alloys except in steel alloys moved from Observation to Restricted.
 - 2.9 Changed: Halogenated hydrocarbons divided into – Halogenated flame retardants, Chlorofluorocarbons and Chlorinated hydrocarbons
 - 2.10 Changed: Short chained chlorinated paraffins
 - 2.11 Changed: Azo-dyes that can decompose to carcinogenic aromatic amines
 - 2.12 Added: Dimethyl (E)-butenedioate (dimethylfumarate or DMF)
 - 2.13 Added: 2-benzotriazole-2-yl-4,6-ditert-butyl-phenol
 - 2.14 Added: Perfluoro octane sulfonates (PFOS)
 - 2.15 Added: Other inorganic compounds
- 3 List of Substances under Observation in products
 - 3.1 Changed: BeO: High power applications for heat transfer, Beryllium copper alloys: Connectors
 - 3.2 Changed: BeO: Carcinogenic
 - 3.3 Changed: Alloys: Forming BeO at recycling

- 3.4 Added/ Changed: All other halogenated flame retardants including: Hexabromocyclododecane (HBCDD) and its diastereoisomers
- 3.5 Added: Medium chained chlorinated paraffins
- 3.6 Deleted: FCs - fluorocarbons
- 3.7 Deleted: HFCs fluorohydrocarbons
- 3.8 Added: Bisphenol A (4,4'-Isopropylidendiphenol)
- 3.9 Added: 4,4' -Diaminodiphenylmethane (MDA)
- 3.10 Added/Changed: Phthalates including i.e: Bis(2-ethylhexyl)phthalate (DEHP); Dibutyl phthalate (DBP); Benzyl butyl phthalate (BBP)
- 3.11 Added: Polycyclic Aromatic Hydrocarbons (PAH) (classified CMR cat 1 or 2)
- 3.12 Added: Perchlorate
- 4 Restricted substances in production
 - 4.1 Added: Chromium (VI) in cement
 - 4.2 Added: Trichlorobenzene
 - 4.3 Added: Perfluoro octane sulfonates (PFOS)
 - 4.4 Added/changed: Nonylphenol and Nonylphenol ethoxylate (Nonylphenolpolyglycoethers)
- 5 Substances under observation in production
 - 5.1 Added: Sodium dichromate
 - 5.2 Added: Aromatic amines
 - 5.3 Added: Isocyanates
 - 5.4 Added: Perfluorooctanoic acid and its salts (PFOA)
 - 5.5 Added: Nitrogen trifluoride
 - 5.6 Added: Sulfur hexafluoride, SF6
- 6 Added: Entire section 3, Further information