

Royal Philips Electronics List of Restricted Substances in Products

Articles (*i.e.* materials, components, subassemblies, products) delivered to and used in Royal Philips must be free of the "Restricted substances" as mentioned in this list.

This or newer versions of the present list can be found at Philips website:

www.philips.com/about/sustainability/howwework/ourproductsandprocesses/chemicalsubstances.page

A: Restricted Substances in all applications (products, parts etc.)

| Substances | Restriction Threshold ppm (mg/kg) ¹ | |
|---|---|--|
| Asbestos (all types) | 10 | |
| Benzoapyrene | 20 | Short duration skin contact (\leq 30 sec) |
| | 1 | Long duration skin contact ($>$ 30 sec) |
| Beryllium and Beryllium compounds (<i>see remark e</i>) | 1000 | |
| Cadmium and Cadmium compounds (in plastics) (<i>see remark d</i>) | 100 ¹ | |
| Cadmium and Cadmium compounds (in metal alloys) (<i>see remark a</i>) | 100 | |
| Hexavalent Chromium (Cr 6+) and Cr (6+) compounds (<i>see remark b</i>) | 1000 | |
| Lead and Lead compounds (<i>see remarks a, b and c</i>) | 1000 | |
| Mercury and Mercury compounds (<i>see remark a, d</i>) | 1000 ¹ | |
| Monomethyl tetrachlorodiphenyl methane (Ugilec 141) | 10 | |
| Monomethyl dichlorodiphenyl methane (Ugilec 121 or Ugilec 21) | 10 | |
| Monomethyl dibromodiphenyl methane (DBBT) | 10 | |
| Ozone depleting substances (<i>see remark f</i>) | 1 | |
| Pentachlorophenol (PCP) and its salts and esters | 10 | |
| Perfluorooctane sulfonates (PFOS's) compounds (<i>see remark g</i>) | 1000 | |
| Polybrominated diphenyl ethers (PBDEs) (<i>see remark h</i>) | 1000 | |
| Polybrominated biphenyls (PBBs) | 1000 | |
| Polychlorinated biphenyls (PCBs) | 10 | |
| Polychlorinated terphenyls (PCTs) | 10 | |
| Sum of all Polycyclic aromatic hydrocarbons (PAHs) (16 mentioned in EPA list) | 200 | Short duration skin contact (\leq 30 sec) |
| | 10 | Long duration skin contact ($>$ 30 sec) |

- a. The restriction does not apply to exemptions in European Directive RoHS (2002/95/EC) - see Annex 1. Nevertheless declaration is still needed. The earlier exemption for deca-BDE was not accepted by Philips.
- b. Will apply to Medical equipment after 1-1-2013 (legislative entry date is 01-01-2014). Currently Medical Equipment is excluded from the EU RoHS Directive. Neither does it apply to the exemptions in EU-RoHS.
- c. Lead-based soldering in electronic circuit boards and other electric applications is exempted in automotive applications under the European ELV directive (2000/53/EC).
- d. Mercury is allowed only in gas discharge lamps with certain conditions referred in EU RoHS exemptions. For Cadmium (in plastics only) and Mercury and their compounds declaration is obligatory above 50 ppm.
- e. Be is exempted in the following applications: i) Be metal and BeO used in X-Ray applications, ii) BeO as ceramic heat-resistant in semiconductors, and iii) Be metal alloy (e.g. BeCu), where no feasible technological alternative exist. In other applications where no feasible technological alternatives exist, exemptions may be granted. Waiver procedure as given in the Framework of Chemical Substances in Products and Processes Document must be followed (http://www.philips.com/shared/assets/Downloadablefile/control_document2.pdf)

¹ Above this restriction threshold the substance is restricted and declaration of the substance is obliged. In fact, restricted substances are not to be intentionally used, that is, Royal Philips Electronics accepts that certain materials contain a certain amount of naturally occurring restricted substances. Thresholds can represent legal limits, or refer to currently accepted analysing thresholds. Furthermore these thresholds should be declared on component level. Substances are measured in homogeneous materials (see also Annex 3). Exemptions of specific applications, mentioned in legislation, are also exempted.

- f. Ozone depleting substances, as published in 2000 in the Montreal protocol on substances that deplete the ozone layer: CFCs (Chlorofluorocarbons), HCFCs (Hydrogenated chlorofluorocarbons), Halons, Methyl Bromide, HBFCs (Hydrobromofluorocarbons), 1,1,1-Trichloroethane, Carbon tetrachloride and bromochloromethane.
- g. Textile and coated materials: 1 µg/m² of the coated material. Derogations (exemptions) proposed in the directive are collected in Annex 1.
- h. Polybrominated diphenylethers (PBDE) are the same as polybrominated biphenylethers (PBBE); polybrominated diphenyloxides (PBDO) are the same as polybrominated biphenyl oxides (PBBO).

B: Additionally Restricted Substances in product packaging

| Substances | Restriction Threshold ppm (mg/kg) ² |
|--|---|
| Arsenic compounds, applied for wood packaging | 10 |
| Formaldehyde emission from composite wood packaging/transport material (<i>see remark l</i>) | |
| • From composite wood (e.g. Particle board (PB) and medium density fiberboard (MDF)) | 0.1 |
| • From Hardwood Plywood (HWPW) | 0.08 |
| Methyl bromide in gassing treatment of wood packaging/transport material | 1 |
| Polyvinyl chloride (PVC) and PVC blends | 1000 |
| Sum of Heavy metals (Cd, Hg, Cr(6+) and Pb) | 100 |

C: Additionally Restricted Substances in Batteries

| Substances | Restriction Threshold ppm (mg/kg) ² |
|---|---|
| Cadmium (all batteries) (<i>see remark i</i>) | 20 |
| Mercury for all batteries (excl button cells) (<i>see remark j</i>) | 5 |
| Mercury for button cells (<i>see remark k</i>) | 20 000 |

- i. Does not apply to Medical equipment
- j. Threshold Mercury for all batteries in China is 1 ppm
- k. This is equal to 2% w/w for mercury (Hg) for button cells

D: Additionally Restricted Substances when used in specific applications (products, parts etc.)

| Substances | Restriction Threshold ppm (mg/kg) ² | Remark |
|--|---|---|
| Antimony in soda lime glass | 1000 | Only applied in lamps |
| Arsenic in soda lime and borosilicate glass | 1000 | |
| Azo Colourants | 30 | Only in direct and prolonged skin contact applications, when e.g. applied in leather and textiles |
| Tris-(1-aziridinyl) phosphin oxide | 10 | |
| Tri-(2,3-dibromo-propyl) phosphate | 10 | |
| Benzene | 5 | As residue in materials |
| Formaldehyde emission from materials (<i>see remark l</i>) | | |
| • From all materials other than Hardwood Plywood (HWPW) | 0.1 | |
| • From Hardwood Plywood (HWPW) | 0.08 | |

² Above this restriction threshold the substance is restricted and declaration of the substance is obliged. In fact, restricted substances are not to be intentionally used, that is, Royal Philips Electronics accepts that certain materials contain a certain amount of naturally occurring restricted substances. Thresholds can represent legal limits, or refer to currently accepted analysing thresholds. Furthermore these thresholds should be declared on component level. Substances are measured in homogeneous materials (See also Annex 3). Exemptions of specific applications, mentioned in legislation, are also exempted.

| Substances | Restriction Threshold ppm (mg/kg) ² | Remark |
|---|--|--|
| Hexachlorobenzene and Trichlorobenzene | 100 | |
| Lead and lead compounds | 300 | Applied in outer sleeves of cables, according to Proposition 65 legislation, USA |
| Lead (See remark m) | 90 | Applied in paint for toys and childcare articles |
| Lead and lead compounds (see remark m) | 300 | Applied in toys and childcare, accessible parts |
| Nickel and nickel alloys (<i>see remark n</i>) | 0,5µg/cm ² /week | Only in direct and prolonged skin contact applications |
| Organostannic compounds | 1000 | Organic Tin compounds (TBT, TPT and TBTO), applied in paints and as pigments and as agents for anti-oxidizing, anti-bacterial, anti-fungal, anti-septic, anti-staining and anti-fouling. |
| PAHs | 50 | In applications such as potting material for electronic ballast |
| Phthalates (<i>see remark n</i>) | 1000 | Applied in toys and childcare articles |
| Phenol and phenolic compounds (<i>see remark o</i>) | 50 mg/l | Applied in toys and childcare articles and laminates of printed wiring boards |
| Polychloronaphtalenes | 10 | > 3 Cl atoms; applied as stabilizer and flame retardant in plastics |
| Short-chain chlorinated paraffins | 1000 | (C10-C13); applied in paints and as flame retardant in PVC |

- l. Formaldehyde emission from materials: Emission from hardwood plywood (HWPW) set to 0.08 ppm and from 1 Jan 2010 onwards set to 0.05 ppm. Emission from other materials including wood-based materials (e.g. particle board (PB) and medium density fibreboard (MDF)) from 1 Jan 2011 onwards set to 0.09. Composite wood is defined by California Code of Regulations (CCR), Title 17, 93120.1. Refer to CCR, title 17, 93120.9 for test methods.
- m. Certification is obligatory for USA.
- n. Does not apply to Medical devices and associated equipment. Medical device safety standards require biocompatibility testing to ensure that chemical substances, which may contact patients during use per the device's intended use, do not pose a health risk, specifically with respect to biocompatibility.
- o. CL (Consumer Lifestyle) requirements for phenol in laminates of printed wiring boards:
- Emission to the air: <200 odor unit/m²/day
Test method: Measured in duplo according to NVN2820 (or NEN-EN 13725:2003) by TNO Apeldoorn, the Netherlands, with 10 dm² of single sided copper added laminate after 3 days at room temperature in a PTFE bag of approximately 40 l.
 - Phenol monomer : <50 mg/l phenolics
Test method: Phenolics content in water (according to ISO 6439) after shaking for 23 hours a mixture of 75 g of milled (to 3 mm) laminate in 1.5 l of demineralized water at pH 4).

E: Additionally Restricted Substances used in specific industrial processes

| Substances | Restriction |
|--|--------------------------------------|
| Hexavalent Chromium (Cr 6+) and Cr 6+ compounds (<i>see remark p, b</i>) | Not allowed in passivation processes |
| Ozone Depleting Substances (<i>see remark q</i>) | Not allowed in processes |

- p. Due to the difficulties to control the plating Cr6+ process, posing compliance risks of products brought to the market by Philips, this substance must not be used in any passivation process.
- q. Use of Ozone Depleting Substances in processes is subject of federal excise tax law applied to all imported electronics in USA.

ANNEX 1 - List of Exemptions and Derogations (proposal of December 3 2008)
EU RoHS Legislation (2002/95/EC)

| Nr | Description | Remark |
|-----|--|--|
| 1 | Mercury in compact fluorescent lamps not exceeding 5 mg per lamp. | |
| 2 | Mercury in straight fluorescent lamps for general purposes not exceeding: | |
| 2.1 | — halophosphate 10 mg | |
| 2.2 | — triphosphate with normal lifetime 5 mg | |
| 2.3 | — triphosphate with long lifetime 8 mg. | |
| 3 | Mercury in straight fluorescent lamps for special purposes. | |
| 4 | Mercury in other lamps not specifically mentioned in this Annex. | |
| 5 | Lead in glass of cathode ray tubes, electronic components and fluorescent tubes. | |
| 6 | Lead as an alloying element in steel containing up to 0,35 % lead by weight, aluminium containing up to 0,4 % lead by weight and as a copper alloy containing up to 4 % lead by weight. | |
| 7.1 | — Lead in high melting temperature type solders (i.e. lead based alloys containing 85 % by weight or more lead) | |
| 7.2 | — lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunications | |
| 7.3 | — lead in electronic ceramic parts (e.g. piezoelectronic devices). | |
| 8 | Cadmium and its compounds in electrical contacts and cadmium plating except for applications banned under Directive 91/338/EEC (1) amending Directive 76/769/EEC (2) relating to restrictions on the marketing and use of certain dangerous substances and preparations. | |
| 9 | Hexavalent chromium as an anti-corrosion of the carbon steel cooling system in absorption refrigerators. | |
| 9a | Deca-BDE in polymeric applications (exemption valid until 1 July 2008). | This exemption is removed by the EU from the list of exemptions per July1st, 08. Furthermore, this exemption was not accepted by Philips – see Table A |
| 9b | Lead in lead-bronze bearing shells and bushes. | |
| 11 | Lead used in compliant pin connector systems. | |
| 12 | Lead as a coating material for the thermal conduction module c-ring. | |
| 13 | Lead and cadmium in optical and filter glass. | |
| 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 | |
| 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 | |
| 17 | Lead halide in High Intensity Discharge (HID) lamps used for professional reprography applications | |
| 18 | Lead as activator in the fluorescent powder... of discharge lamps when used as sun tanning lamps (...) as well as (...) specialty lamps for diazo-printing reprography, lithography (...) | |
| 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) | |
| 20 | Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCDs) | |
| 21 | Lead and cadmium in printing inks for the application of enamels on borosilicate glass. | |
| 22 | Lead as impurity in RIG (rare earth iron garnet) Faraday rotators used for fibre optic communications systems. | |
| 23 | Lead in finishes of fine pitch components other than connectors with a pitch of 0.65 mm or less with NiFe lead frames until and lead in finishes of fine pitch components other than connectors with a pitch of 0.65 mm or less with copper lead-frames. | |
| 24 | Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors. | |

| Nr | Description | Remark |
|----|---|--|
| 25 | Lead oxide in plasma display panels (PDP) and surface conduction electron emitter displays (SED) used in structural elements; notably in the front and rear glass dielectric layer, the bus electrode, the black stripe, the address electrode, the barrier ribs, the seal frit and frit ring as well as in print pastes. | |
| 26 | Lead oxide in the glass envelope of Black Light Blue (BLB) lamps. | |
| 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. | |
| 28 | Hexavalent chromium in corrosive preventive coatings of unpainted metal sheetings and fasteners used for corrosion protection and Electromagnetic Interference Shielding in equipment falling under category three of Directive 2002/96/EC (IT and telecommunications equipment). | Expired - Exemption granted until 1 July 2007. |
| 29 | Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC. | |
| 30 | Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100 dB (A) and more. | |
| 31 | Lead in soldering materials in mercury free flat fluorescent lamps (which e.g. are used for liquid crystal displays, design or industrial lighting). | |
| 32 | Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes. | |

EU RoHS Legislation (2002/95/EC), applications exempted from the ban in Article 4(1) as regards Categories 8 and 9.

| Nr | Description | Remark |
|--|--|--------|
| Equipment utilising or detecting ionising radiation | | |
| 1 | Lead, cadmium and mercury in detectors for ionising 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 ionising 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 (plus item 1) | | |
| 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 | |
| Other applications | | |
| 9 | Cadmium in helium-cadmium lasers | |
| 10 | Lead and cadmium in atomic adsorption spectroscopy lamps | |
| 11 | Lead in alloys as a superconductor and thermal conductor in MRI | |
| 12 | Lead and cadmium in metallic bonds to superconducting materials in MRI and SQUID detectors | |
| 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 | |

EU Directive (2006/122/ECOF) on marketing and use of perfluorooctane sulfonates

| Nr | Description | Remark |
|-----|--|--|
| (a) | Photoresists or anti reflective coatings for photolithography processes | |
| (b) | Photographic coatings applied to films, papers, or printing plates, | |
| (c) | 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 | This exemption is not accepted by Philips as Cr 6+ plating process is restricted (see Table E) |

| Material/ Substance Family | Examples of substances covered | CAS Numbers | Legal and Regulatory Information | Examples of Use |
|---|--|---|--|--|
| Cadmium/ Cadmium Compounds | Cadmium Cadmium oxide Cadmium sulfide Cadmium chloride Cadmium sulfate Other cadmium compounds | 7440-43-9 1306-19-0 1306-23-6 10108-64-2 10124-36-4 - | 76/769/EEC 91/338/EEC; 91/157/EEC, 93/86/EEC; 2000/53/EEC (EU/ELV); 2002/95/EC (EU/RoHS); 94/62/EEC; | Pigment, anti-corrosion surface treatment, electric and electronic materials, optical material, stabilizer, plating, pigment for resin, fluorescent, electrode, solder, electric contact, contact point, zinc plating, stabilizer for PVC |
| Cadmium, Lead, mercury and their compounds in batteries | See under Cadmium, Lead and Mercury | | 2006/66/EC | Batteries |
| DBBT (monomethyl dibromodiphenyl methane) | | 99688-47-8 | 76/769/EEC, 91/339/EEC | Insulation oil, lubricant oil, electrical insulation medium, solvent, electrolytic solution |
| Formaldehyde | | 50-00-0 | Emission to the air and skin contact (baby, textile and composite wood/packaging applications) Germany: Chem Verbot V Denmark: statut. order nr 289 Austria, Norway, Poland, Lithuania, Finland, The Netherlands USA – CA (93120-93120.12, title 17, California Code of Regulations) | Residues and degradation products of plastics (aminoplasts, urea- and melamine resins, foam plastics, vulcanization accelerators, basis for synthetic tannins, biocides, adhesives, Composite wood panel (including electronics with composite wood components and composite wood crates or pallets used for packaging) - Hardwood Plywood (HWPW), Particleboard (PB), and Medium Density Fiberboard (MDF) |
| Benzene and specific chlorobenzenes | Benzene Hexachlorobenzene Trichlorobenzene | 71-43-2 118-74-1 120-82-1 | 76/769/EEC | As residue in materials |
| Hexavalent Chromium/ Hexavalent Chromium Compounds | Chromium (VI) oxide Barium chromate Calcium chromate Chromic acetate Chromium trioxide Lead (II) chromate Sodium chromate Sodium dichromate Strontium chromate Potassium dichromate Potassium chromate Zinc chromate Other hexavalent chromium compounds | 1333-82-0 10294-40-3 13765-19-0 1066-30-4 1333-82-0 7758-97-6 7775-11-3 10588-01-9 7789-06-2 7778-50-9 7789-00-6 13530-65-9 - | 2000/53/EC (EU/ELV), 2002/95/EC (EU RoHS), 94/62/EEC, | Chromate treatment, paints adhesion enhancement, anti corrosion |
| Lead/Lead Compounds | Lead Lead (II) sulfate Lead (II) carbonate Lead hydrocarbonate Lead acetate Lead (II) acetate, trihydrate | 7439-92-1 7446-14-2 598-63-0 1319-46-6 301-04-2 6080-56-4 | 76/769/EEC 86/677/EEC, 91/157/EEC, 93/86/EEC, 2000/53/EC (EU/ELV), | Rubber hardener, pigment, paint, lubricant, plastic stabilizer, materials for battery, free-machining alloy, free-cutting steels, |

| Material/ Substance Family | Examples of substances covered | CAS Numbers | Legal and Regulatory Information | Examples of Use |
|---|--|--|--|--|
| | Lead phosphate Lead selenide Lead (IV) oxide Lead (II,IV) oxide Lead (II) sulfide Lead (II) oxide Lead (II) carbonate basic Lead hydroxidcarbonate Lead (II) phosphate Lead (II) chromate Lead (II) titanate Lead sulfate, sulphuric acid, lead salt Lead sulphate, tribasic Lead stearate Other lead compounds | 7446-27-7 12069-00-0 1309-60-0 1314-41-6 1314-87-0 1317-36-8 1319-46-6 1344-36-1 7446-27-2 7758-97-6 12060-00-3 15739-80-7 12202-17-4 1072-35-1 56189-09-4 | 2002/95/EC (EU/RoHS), 94/62/EEC, | optical materials, X-ray shielding in CRT glass, electrical solder material, mechanical solder materials, curing agent, vulcanizing agent, ferroelectrics, resin stabilizer, plating, metal alloy, resin additives |
| Mercury/ Mercury Compounds | Mercury Mercuric chloride Mercury (II) chloride Mercuric sulfate Mercuric nitrate Mercuric (II) oxide Mercuric sulfide Other mercury compounds | 7439-97-6 33631-63-9 7487-94-7 7783-35-9 10045-94-0 21908-53-2 1344-48-5 - | 76/769/EEC, 86/677/EEC, 91/157/EEC +98/101/EEC, 2000/53/EC (EU/ELV), 2002/95/EC (EU/RoHS), 94/62/EEC | Fluorescent bulb, contact point material, pigment, anti-corrosion, high- efficiency phosphor, antibacterial treatment |
| Methyl Bromide | Bromomethane (Methyl Bromide) | 74-83-9 | | Gasping treatment of wood packaging/transport material |
| Nickel/ Nickel alloys | Nickel | 7440-02-0 | | nickel plating, metal and alloy |
| Organic Tin Compounds (Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)) | Bis(tri-n-butyltin) oxide Triphenyltin N,N'-dimethyldithiocarbamate Triphenyltin fluoride Triphenyltin acetate Triphenyltin chloride Triphenyltin hydroxide Triphenyltin fatty acid salts (C=9-11) Triphenyltin chloroacetate Tributyltin methacrylate Bis(tributyltin) fumarate Tributyltin fluoride Bis(tributyltin) 2,3-dibromosuccinate Tributyltin acetate Tributyltin laurate Bis(tributyltin) phthalate Copolymer of alkyl acrylate, methyl methacrylate and tributyltin methacrylate(alkyl; C=8) Tributyltin sulfamate Bis(tributyltin) maleate Tributyltin chloride Other Tributyl Tins & Triphenyl Tins | 56-35-9 1803-12-9 379-52-2 900-95-8 639-58-7 76-87-9 47672-31-1 7094-94-2 2155-70-6 6454-35-9 1983-10-4 31732-71-5 56-36-0 3090-36-6 4782-29-0 - 6517-25-5 14275-57-1 1461-22-9 - | 89/677/EEC, 99/51/EEC, Japanese law | TBT and TPT = Anti-oxidizer, antibacterial and antifungal agents, antifoulant TBTO = Antiseptic, antifungal agent, paint, pigment, antistaining |
| Ozone Depleting Substances Chloro Fluoro Carbons (CFCs) | Trichlorofluoromethane (CFC 11) Dichlorodifluoromethane (CFC12) Chlorotrifluoromethane (CFC 13) Pentachlorofluoroethane (CFC 111) Tetrachlorodifluoroethane (CFC 112) Trichlorotrifluoroethane (CFC 113) 1,1,2 Trichlorotrifluoroethane Dichlorotetrafluoroethane (CFC 114) Monochloropentafluoroethane (CFC 115) Heptachlorofluoropropane (CFC 211) | 75-69-4 75-71-8 75-72-9 354-56-3 76-12-0 354-58-5 76-13-1 76-14-2 76-15-3 422-78-6 /135401-87-5 | Law Concerning the Protection of the Ozone Layer through the Control of Specified Substances and others (Japanese law), Montreal Protocol, 1990 | refrigerant, foaming agent, extinguishant, solvent cleaner |

| Material/ Substance Family | Examples of substances covered | CAS Numbers | Legal and Regulatory Information | Examples of Use |
|---|--|---|--|-----------------|
| Halons (HCFCs) | Hexachlorodifluoropropane (CFC 212) | 3182-26-1 | revision of Article 611 of the Clean Air Act (US law); Regulation (EC) No. 2037/2000 on substances | |
| | Pentachlorotrifluoropropane (CFC 213) | 2354-06-5/134237-31-3 | | |
| | Tetrachlorotetrafluoropropane (CFC 214) | 29255-31-0 | | |
| | 1,1,1,3-Tetrachlorotetrafluoropropane | 2268-46-4 | | |
| | Trichloropentafluoropropane (CFC 215) | 1599-41-3 | | |
| | 1,1,1-Trichloropentafluoropropane | 4259-43-2 | | |
| | 1,2,3-Trichloropentafluoropropane | 76-17-5 | | |
| | Dichlorohexafluoropropane (CFC 216) | 661-97-2 | | |
| | Monochloroheptafluoropropane (CFC 217) | 422-86-6 | | |
| | Halons (HCFCs) | Bromochlorodifluoromethane (Halon 1211) | | |
| Bromotrifluoromethane (Halon 1301) | | 75-63-8 | | |
| Dibromotetrafluoroethane (Halon 2402) | | 124-73-2 | | |
| Chlorinated hydrocarbons (CHCs) | Carbon Tetrachloride (Tetrachloromethane) | 56-23-5 | | |
| | 1,1,1, - Trichloroethane (methyl chloroform) | 71-55-6 | | |
| Methylbromide | Bromomethane (Methyl Bromide) | 74-83-9 | | |
| Bromochloro methane | Bromochloromethane | 74-97-5 | | |
| Hydrobromofluorocarbons (HBFCs) | Bromodifluoromethane and isomers (HBFCs) | 1511-62-2 | | |
| Hydrogenated chlorofluorocarbons | Dichlorofluoromethane (HCFC 21) | 75-43-4 | | |
| | Chlorodifluoromethane (HCFC 22) | 75-45-6 | | |
| | Chlorofluoromethane (HCFC 31) | 593-70-4 | | |
| | Tetrachlorofluoroethane (HCFC 121) | 134237-32-4 | | |
| | Trichlorodifluoroethane (HCFC 122) | 41834-16-6 | | |
| | Dichlorotrifluoroethane(HCFC 123) | 34077-87-7 | | |
| | Chlorotetrafluoroethane (HCFC 124) | 63938-10-3 | | |
| | Trichlorofluoroethane (HCFC 131) | 27154-33-2 | | |
| | Dichlorodifluoroethane (HCFC 132) | 25915-78-0 | | |
| | Chlorotrifluoroethane (HCFC 133) | 1330-45-6 | | |
| | Dichlorofluoroethane(HCFC 141) | 1717-00-6 | | |
| | Chlorodifluoroethane (HCFC 142) | 25497-29-4 | | |
| | Hexachlorofluoropropane (HCFC 221) | 134237-35-7 | | |
| | Pentachlorodifluoropropane (HCFC 222) | 134237-36-8 | | |
| | Tetrachlorotrifluoropropane (HCFC 223) | 134237-37-9 | | |
| | Trichlorotetrafluoropropane (HCFC 224) | 134237-38-0 | | |
| | Dichloropentafluoropropane, (Ethyne, fluoro-) (HCFC 225) | 127564-92-5 | | |
| | Chlorohexafluoropropane (HCFC 226) | 134308-72-8 | | |
| | Pentachlorofluoropropane (HCFC 231) | 134190-48-0 | | |
| | Tetrachlorodifluoropropane (HCFC 232) | 134237-39-1 | | |
| | Trichlorotrifluoropropane (HCFC 233) | 134237-40-4 | | |
| | Dichlorotetrafluoropropane (HCFC 234) | 127564-83-4 | | |
| | Chloropentafluoropropane (HCFC 235) | 134237-41-5 | | |
| | Tetrachlorofluoropropane (HCFC 241) | 134190-49-1 | | |
| | Trichlorodifluoropropane (HCFC 242) | 134237-42-6 | | |
| | Dichlorotrifluoropropane (HCFC 243) | 134237-43-7 | | |
| | Chlorotetrafluoropropane (HCFC 244) | 134190-50-4 | | |
| | Trichlorofluoropropane (HCFC 251) | 134190-51-5 | | |
| | Dichlorodifluoropropane (HCFC 252) | 134190-52-6 | | |
| | Chlorotrifluoropropane (HCFC 253) | 134237-44-8 | | |
| | Dichlorofluoropropane (HCFC 261) | 134237-45-9 | | |
| | Chlorodifluoropropane (HCFC 262) | 134190-53-7 | | |
| | Chlorofluoropropane (HCFC 271) | 134190-54-8 | | |
| 2-chloro-2-fluoropropane | 420-44-0 | | | |
| And other hydrochlorofluorocarbon compounds | - | | | |

| Material/ Substance Family | Examples of substances covered | CAS Numbers | Legal and Regulatory Information | Examples of Use |
|--|---|---|--|--|
| Perfluorooctane sulfonates (PFOS) | Ammonium heptadecafluoro-octanesulphonate Heptadecafluoro-1-octanesulfonic acid compound with diethanolamine Lithium perfluorooctane sulfonate Perfluorooctane sulfonic acid Potassium perfluorooctanesulfonate | 29081-56-9 70225-14-8 29457-72-5 1763-23-1 2795-39-3 | 2006/122/ECOF | - Photoresists or anti reflective coatings for photolithography process - Transcription belt and rubber roller coatings for printers - Surface treatment agents (mist suppressants for Cr(VI) plating, dehydrator for chromate treatment, etching additives, pretreatment and post treatment agent etc) - Painting resin, Printed circuit board, Ceramic board, PTFE, Fluoric Resin. - Coating in paper. - Paints, Colors, Pigment - Solder Flux, Cream Solder - Fluoric mold spat etc. - PFOS is used for a surfactant and a dispersion agent etc besides the mentioned use above. |
| Polychlorinated Biphenyls (PCBs) & Poly Chlorinated Terphenyls (PCTs) | Polychlorinated Biphenyls Aroclor Chlorodiphenyl (Aroclor 1260) Kanechlor 500 Aroclor 1254 Terphenyls Poly Chlorinated Terphenyls | 1336-36-3 12767-79-2 11096-82-5 27323-18-8 11097-69-1 26140-60-3 61788-33-8 | 76/769/EEC | Insulation oil, lubricant oil, electrical insulation medium, solvent, electrolytic solution |
| Pentachlorophenol (PCP) | Pentachlorophenol (PCP) Pentachlorophenol, sodium salt other PCP salts and compounds | 87-86-5 131-52-2 | 91/173/EEC, 99/51/EEC 94/783/EEC (Germany) 96/211/EEC (Denmark) | |
| Phenol and phenolic compounds | Phenol Phenolic derivate | 108-95-2 85954-11-6 | | Laminates, chipboard |
| Phthalates | Bis(2-ethylhexyl)phthalate (DEHP) Dibutyl phthalate (DBP) Benzyl butyl phthalate (BBP) di-"isononyl" phthalate (DINP) di-"isodecyl" phthalate (DIDP) di-n-octyl phthalate (DNOP) | 117-81-7 84-74-2 85-68-7 28553-12-0/68515-48-0 26761-40-0/68515-49-1 117-84-0 | 76/769/EEC | plasticizer, dye, pigment, paint, ink, adhesive, lubricant |
| Polybrominated Diphenylethers (PBDEs) | Poly Brominated Biphenyl Ether (PBBE) are same as Poly Brominated Dihenyl Ether (PBDE), Poly Brominated Diphenyl oxides (PBDO) and Poly Brominated Biphenyl oxides (PBBO) | 32534-81-9 | 2002/95/EC (EU/RoHS), pentaBDE, 76/769/EEC +2003/11/EC | Flame retardant |
| Polybrominated Biphenyls (PBBs) | Bromobiphenyl and its ethers " " " Decabromobiphenyl and its ethers " Dibromobiphenyl and its ethers | 2052-07-5 (2-Bromobiphenyl) 2113-57-7 (3-Bromobiphenyl) 92-66-0 (4-Bromobiphenyl) 101-55-3 (ether) | 2002/95/EEC (EU/RoHS) | Flame retardant |

| Material/ Substance Family | Examples of substances covered | CAS Numbers | Legal and Regulatory Information | Examples of Use |
|--|--|---|--|--|
| | <p>“ Heptabromobiphenylether Hexabromobiphenyl and its ethers “ “ “ Nonabromobiphenylether Octabromobiphenyl and its ethers “ Pentabromobidphenyl ether Polybrominated Biphenyls Tetrabromobiphenyl and its ethers “ Tribromobiphenyl ether</p> | <p>13654-09-6 1163-19-5 (ether) 92-86-4 2050-47-7 (ether) 68928-80-3 59080-40-9 36355-01-8 (hexabromo- 1,1.-biphenyl) 67774-32-7 (Firemaster FF-1) 36483-60-0 (ether) 63936-56-1 61288-13-9 32536-52-0 (ether) 32534-81-9 59536-65-1 40088-45-7 40088-47-9 (ether) 49690-94-0</p> | | |
| Polychloronaphthalenes | <p>Polychlorinated Naphthalenes Other polychlorinated Naphthalenes</p> | <p>70776-03-3 -</p> | <p>The Law concerning the Examination and Regulation of Manufacture etc. of Chemical Substances (Class 1 chemical substances: Japanese law),</p> | <p>lubricant, paint, stabilizer (electric characteristic, flame-resistant, water-resistant) insulator, flame retardant</p> |
| <p>Polycyclic aromatic hydrocarbons (PAHs) (16 included in EPA list)</p> | <p>Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(g,h,i)perylene Benzo(a)pyrene Chrysene Dibenz(a,h)anthracene Fluorene Fluoranthene Indeno(1,2,3-c,d)pyrene Naphthalene Phenanthrene Pyrene (Polycyclic aromatic hydrocarbons</p> | <p>83-32-9 208-96-8 120-12-7 56-55-3 205-99-2 207-08-9 191-24-2 50-32-8 218-01-9 53-70-3 86-73-7 206-44-0 193-39-5 91-20-3 85-01-08 129-00-0 (130498-29-2)</p> | <p>67/548/EEC 850/2004/EEC Unece Protocol 2005/69/EC German Stiftung Warentest based on 2001/95/EC and EC/1935/2004</p> | <p>Extender oils (used to give flexibility to rubber) (Tool) handles Cable sheaths</p> |
| Shortchain Chlorinated Paraffins | | 63448-39-8 | 76/769/EEC +2002/45/EC | Plasticizer for PVC, flame retardant |
| Sum of Heavy metals (Cd, Hg, Cr(6+) and Pb) | | | | Packaging |
| Tris(1-aziridinyl) phosphin oxide (TEPA) | | 545-55-1 | 76/769/EEC 83/264/EEC | Leather, textiles |
| Tris-(2,3-dibromopropyl) phosphate | | 126-72-7 | 76/769/EEC 79/663/EEC | Leather, textiles |
| Ugilec 141 (tetrachlorodiphenyl methane) | | 76253-60-6 | 76/769/EEC, 91/339/EEC | Insulation oil, lubricant oil, electrical insulation medium, solvent, electrolytic solution |

| Material/ Substance Family | Examples of substances covered | CAS Numbers | Legal and Regulatory Information | Examples of Use |
|---|---------------------------------------|--------------------|---|--|
| Ugilec 121 (or Ugilec 21) (monomethyl dichlorodiphenyl methane) | | - | 76/769/EEC, 91/339/EEC | Insulation oil, lubricant oil, electrical insulation medium, solvent, electrolytic solution |
| Vinyl Chloride Polymer (PVC) | | | | Packaging material, e.g. blisters and bags Insulator, chemical resistance, transparency, sheath material |

ANNEX 3 – Explanation of difference between declaration on homogeneous material level and article level

“Homogeneous material” (EU RoHS) versus
“Article level” (EU REACH)

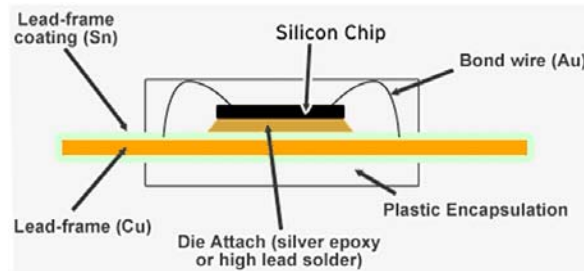


Figure 1: material break down of a integrated Circuit (IC)

Substance X <0,1% at Homogenous Material level:

- Plastic Encapsulation < 0,1%
- Lead frame < 0,1%
- Lead frame coating < 0,1%
- Die Attach < 0,1%
- etc.

Substance X <0,1% at Article level:

Lead frame coating + Silicon chip + Bond wire + Die attach + Plastic encapsulation + etc. < 0,1%

Note that some materials within the article may contain higher levels (>0.1%), but the total content of the complete article should be taken into consideration to calculate overall concentration of substance X in this article

ANNEX 4 – Revision History

| Date Revision | Short Explanation |
|---------------|--|
| 1-1-2009 | <ul style="list-style-type: none"> • Lead in Childcare products according to USA requirements was added. • Beryllium: exemption Be metal alloy added (where no feasible technological alternative exist). • EU ROHS substances for medical devices were added to the restricted List with a phase-out date of 1-1-2013. • Formaldehyde emission levels from composite wood have been changed according to California legislation • Restriction to Cr6+ in processes limited to passivation processes • EU ROHS exemptions lists is replaced by the December 3 2008 EU Commission proposal • Annex 3 is added with an explanation on homogeneous and article product declaration |
| 7-8-2008 | <ul style="list-style-type: none"> • Beryllium: few exemptions and possibility for waivers were included. • Cadmium and Mercury declaration obligation above 50 ppm, moved from the footnote to one of the remarks just below the table for more visibility. There was no change on the content. • Perfluorooctane Sulfonates (PFOS's) compounds were added to the list as they will be restricted as from 27 June 2008 (EU DIRECTIVE 2006/122/ECOF). • Sum of all Polycyclic Aromatic Hydrocarbons (PAHs) (16 mentioned in EPA list) and Benzoapyrene: Those substances are included in the UNECE Protocol to be formalized in Regulation 850/2004/EEC on Persistent Organic Pollutants (POPs). Furthermore, also the "German Stiftung Warentest" or GS imposes this requirements for consumer products, based on the German transposition of the General Product Safety Directive (2001/95/EC) and the regulation on food contact materials (EC/1935/2004) to justify the legal basis for this requirement. • Formaldehyde: requirements have been split into two categories, namely in products (in e.g. wooden loudspeakers, bread roasters, etc.) and packaging material (incl. transportation material, like pellets). Official requirements exist in many countries, like Germany Chem Verbot V, Denmark statut. order nr 289, Austria, Norway, Poland, Lithuania, Finland, The Netherlands, USA – CA (93120-93120.12, title 17, California Code of Regulations). The limits in CA for HWPW were corrected. • Restricted Substances in Batteries: to follow legislation. • Chlorobenzene: general "chlorobenzene" was replaced by the two hazardous forms, hexachlorobenzene and trichlorobenzene (CMR 1 and 2, respectively). • Chromium 6+ in plating process: Due to the difficulties to control the plating Cr6+ process, posing compliance risks of products brought to the market by Philips, it is proposed to fully restrict use of this substance in any plating or passivation process. • Ozone Depleting Substances in processes: ODCs are subject of federal excise tax law applied to all imported electronics in USA. As part of federal efforts to implement the Montreal Protocol, the U.S. tax code applies excise taxes on the importation of a range of products – including electronics – based on the use or presence of banned/restricted ODCs. These taxes apply even if the ODCs were only used as process chemicals in the manufacture of the products and were never intended to be in the finished product. While there is a minimis exception for certain types of products, this exception does not apply to electronics. Prove of non-use must be delivered in order to apply for exemption. • For clarity and help, annexes containing a list with exemptions and more detailed information about the substances of this list (CAS numbers, names, legislation information, use) were added. |
| 1-1-2007 | <ul style="list-style-type: none"> • Due to its toxicity (CMR category 1) and to prepare ourselves on REACH, Beryllium is made restricted now. • To solve problems at numerous suppliers, who only guarantee the ROHS limits, the restriction thresholds limits for Cd in plastics and Hg are changed to the ROHS limits (100 and 1000 ppm, respectively). To be sure that these supplied materials have Cd and Hg concentrations well below the legal ROHS limits, declaration above 50 ppm is introduced for these substances. Therefore also the text "declaration threshold" is changed into "restriction threshold" on the restricted substance list. • Some minor text changes are made for phthalates on the restricted list and lead reporting for PMS on the relevant list. |