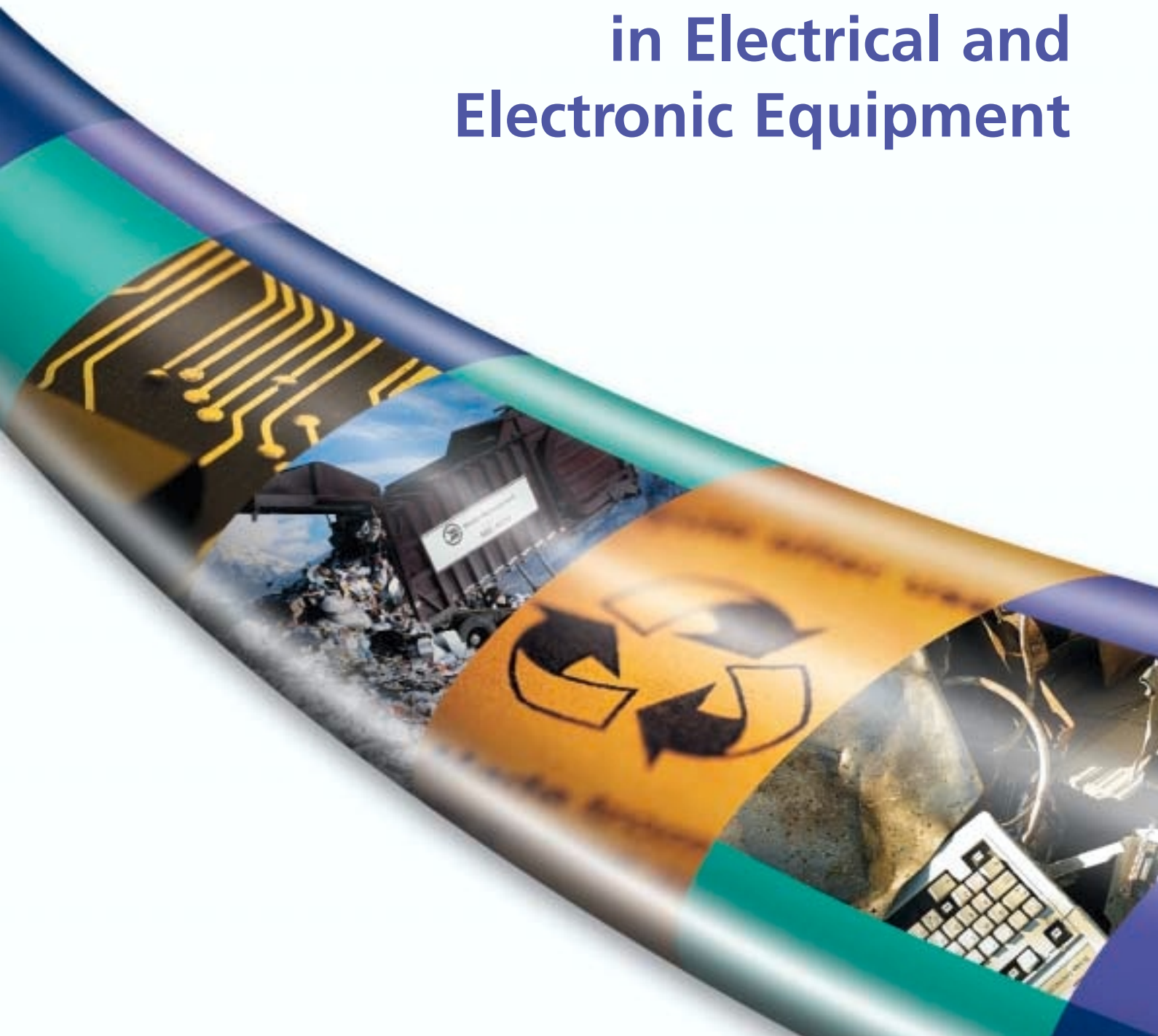


Intertek

Hazardous Substances in Electrical and Electronic Equipment



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Intertek's global reach is our major strength linking suppliers in one part of the world with buyers in another. We independently inspect factories and goods in the countries of origin across the whole supply chain on behalf of clients and consumers located in the products' final market. In fact we can test the same product to a range of international standards if required.

Intertek has 273 offices and labs offering inspection, auditing and certification services and multiple laboratories worldwide providing a wide range of standard and custom testing programmes.

Our resources are strategically placed, providing appropriate

services in each country. These needs are continuously reassessed, and we are constantly evaluating manufacturing and market trends to best serve our customers.

The Intertek Group is in the ideal position to help our customers and clients meet the Quality, Safety and

Ethical standards irrespective of their, or their customer's location in the world. Our mix of testing, inspection, auditing and consultancy services is unparalleled in the consumer goods arena making Intertek the primary supplier of choice for many of the world's leading brands.

Introduction

As the pace of technological advancement accelerates at an ever increasing rate the volume of waste electrical and electronic equipment grows apace! Globally drawing attention from regulatory authorities keen to minimise the environmental impact, particularly from hazardous substances, and hold the producers responsible for compliance.

For more information about hazardous substances in electrical and electronic equipment, e-mail: weee@intertek.com



Hazardous Substances in Electrical and Electronic Equipment

European Requirements

WEEE Directive 2002/96/EC

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC, as amended by 2003/108/EC, covers almost all EEE in the 10 categories shown below. Making producers financially responsible for the separate collection and environmentally-friendly treatment of their own WEEE. Manufacturers, own branders (retailers selling products under their own brand), importers and exporters must all comply with these new EU requirements for EEE.

The 10 Categories of WEEE

WEEE Categories	EEE Products
1. Large household appliances	Refrigerators, freezers, cookers, washing machines, tumble dryers etc.
2. Small household appliances	Vacuum cleaners, toasters, coffee makers, hair dryers, clocks, watches, scales etc.
3. IT & telecommunications equipment	Computers, printers scanners, calculators, fax machines, phones, mobile phones etc.
4. Consumer equipment	Televisions, radios, video recorders, DVD players, cameras etc.
5. Lighting equipment (except filament light bulbs & household luminaires)	Non-household fluorescent lamps, discharge lamps etc.
6. Electrical and electronic tools (except large stationary industrial tools)	Drills, saws, lawn mowers, hedge trimmers, leaf blowers, spraying equipment, riveting, nailing and screwing tools etc.
7. Certain toys, leisure and sports equipment	Electric trains, car racing sets, hand-held video game consoles, video games, computers for biking, diving, running, rowing etc., sports equipment with electric or electronic components and coin slot machines.
8. Medical devices (except where implanted or contaminated)	Appliance used for detecting, preventing monitoring or alleviating illness, injury or disability.
9. Monitoring and control instruments	Smoke detectors, thermostats, measuring, weighing or adjusting appliances for household or laboratory use and industrial monitoring and control instruments.
10. Automatic dispensers	Dispensers automatically delivering all kinds of goods, such as drinks, confectionary, money etc.

Materials & Components to be Selectively Removed Before Treatment

EEE designs will need to allow the following materials and components to be easily and safely removed:

- All liquids;
- Capacitors containing polychlorinated biphenyls (PCBs) & polychlorinated terphenyls (PCTs);
- Electrolyte capacitors;
- Mercury-containing components;
- Batteries;
- Printed circuit boards from mobile phones;
- Printed circuit boards from other devices with a surface area greater than 10 cm²;
- Toner cartridges etc.;
- Plastics containing brominated flame retardants;
- Cathode ray tubes (and fluorescent coating to be removed);
- External electric cables;
- Refractory ceramic fibre-containing components;
- Radioactive substances;
- CFCs, HCFCs, HFCs & HCs (ozone depleting substances and those with a global warming potential (GWP) > 15, are treated per Regulation (EC) No 2037/2000);
- Liquid crystal displays (LCDs) with a surface area greater than 100 cm²;
- LCDs back-lit by gas discharge lamps;
- Gas discharge lamps (and mercury to be removed);
- Asbestos containing components and asbestos waste.

Hazardous Substances in Electrical and Electronic Equipment

Date	WEEE Requirements
13 Aug 2004	<ul style="list-style-type: none"> National WEEE legislation implemented.
13 Aug 2005	<ul style="list-style-type: none"> National WEEE legislation comes into force. Separate collection of WEEE, selective removal of certain materials & components and treatment at licensed or registered sites begins. Producers shall guarantee to finance the collection, treatment, recovery & recycling of separately collected WEEE. EEE shall be labelled with: <ul style="list-style-type: none"> Name/trademark of the producer; New marking indicating the EEE was placed on the market after 13 August 2005; Crossed wheelee bin symbol warning that the WEEE should not be discarded with general waste. <p>In exceptional cases (e.g. where necessary due to the size/function of the EEE) this symbol shall be printed on the packaging and instructions for use and warranty.</p>
31 Dec 2006*	<ul style="list-style-type: none"> National targets for separately collected WEEE of 4 kg per head to be met. Targets for the rate of recovery of WEEE (between 70% and 80%), including reuse and recycling of components/materials (between 50% and 75%), to be met per category of WEEE (based on the average weight per EEE). <ul style="list-style-type: none"> Exported WEEE only counts if recovered/recycled under equivalent conditions. Reuse of whole EEE is not included.
31 Dec 2008*	<ul style="list-style-type: none"> New recovery & recycling targets to be set for WEEE, including reuse of whole appliances.

* The 10 new EU Member States may extend these deadlines by: **12 months:** Slovenia (2004/312/EC); **24 months:** Czech Republic, Estonia, Hungary, Latvia, Lithuania, and Slovakia (2004/312/EC) and Cyprus, Malta and Poland (2004/486/EC)

RoHS Directive 2002/95/EC

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC covers a

similar range of EEE to the WEEE Directive, except that it:

- Includes filament light bulbs and household luminaires;
- Excludes medical devices and monitoring & control equipment (WEEE categories 8 & 9).

From 1st July 2006, new electrical and electronic equipment placed on the market shall not contain:

- Lead (Pb);
- Mercury (Hg);
- Cadmium (Cd);
- Hexavalent chromium (VI) (Cr (VI));
- Polybrominated biphenyls (PBBs);
- Polybrominated diphenyl ethers (PBDEs).

Though there are a number of permitted uses under RoHS where viable alternatives are not yet available.

Although not included in the RoHS Directive, maximum limits for these substances are being defined by the EU's Technical Adaptation Committee (TAC). Though still to be approved, the proposed limits are 0.01% for cadmium (per the EU Cadmium Directive 91/338/EEC) and 0.1% for the other substances. These limits will apply to all homogenous materials within the equipment, unless otherwise exempt.

Substances	Permitted uses under RoHS
Mercury	Fluorescent & other types of lamps.
Lead	Glass CRTs, electronic components, fluorescent tubes, certain alloys, solders for specified uses, electronic ceramics.
Cadmium	Cadmium plating, unless banned under the Cadmium Directive 91/338/EEC.
Chromium (VI)	Anti-corrosion agent for the carbon steel cooling system in absorption refrigerators.
PBBs & PBDEs	None

Hazardous Substances in Electrical and Electronic Equipment

We strongly recommend that you verify the compliance of your current EEE to the RoHS Directive, identifying failures which may require lengthy development work to rectify for new products before the 1 July 2006 RoHS deadline (e.g. replacing lead solders or PBDEs in plastic housings). Many manufacturers have similar corporate hazardous substances restrictions and may require testing to support your declaration of conformity.

Packaging and Packaging Waste Directive 94/62/EC

Directive 94/62/EC, as amended by 2004/12/EC, covers all types and materials of packaging placed on the EU market. Including a requirement that the sum total of the concentrations of lead, cadmium, mercury and hexavalent chromium present in packaging or packaging components shall not exceed 100 parts per million (100 ppm).

Batteries and Accumulators Directive 91/157/EEC

Batteries and accumulators shall not contain more than 0.0005% (5 mg/kg) by weight of mercury, except for button cells and batteries composed of button cells for which the limit is 2% of mercury by weight. Batteries and accumulators containing more than 0.025% cadmium or 0.4% lead have

to be labelled with their heavy metal content and disposed of separately. These requirements are specified in Directives 91/357/EEC, as amended by 98/101/EC and 93/86/EEC.

Marketing and Use of Certain Dangerous Substances and Preparations Directive 76/769/EEC

Many hazardous substances, their preparations and products containing them, are restricted by amendments to Directive 76/769/EEC, e.g. cadmium, mercury, arsenic, nickel, PCP, PCBs, PCTs, PBBs, penta- and octaBDE.

Nickel Directive 94/27/EC

Nickel is commonly found in plating, stainless steels and other alloys, and may be released during direct, prolonged skin contact. This can cause serious sensitisation, skin irritation and allergic reactions. The Nickel Directive 94/27/EC minimises these risks by setting a maximum rate for nickel release of 0.5 µg/cm²/week.

Azocolourants Directive 2002/61/EC

Certain azocolourants which leach from dyed textiles, leather etc during direct, prolonged skin contact may cleave to release

allergenic and carcinogenic aromatic amines. These may be absorbed by the skin, possibly causing an allergic reaction and increased risk of cancer. None of the 22 aromatic amines listed in 2002/61/EC may be released in detectable concentrations (above 30 ppm).

Cadmium Directive 91/338/EEC

The Cadmium Directive 91/338/EEC applies a 0.01% (100 ppm) limit for the cadmium content of finished products or components manufactured from specified plastics, liquid paints (solvent and water-based) and also bans cadmium plating for certain types of equipment.

Cadmium - Netherlands Chemical Substances Act Cadmium Decree 1999

The Dutch Cadmium Decree extends the scope of the EU Directive to all products with a cadmium content above 100 mg/kg (100 ppm) when it is used as a pigment, dye or stabilizer and bans the use of cadmium plating. Gypsum may only contain a maximum 2 mg/kg of cadmium, with its use banned in photographic film and fluorescent lamps.

Hazardous Substances in Electrical and Electronic Equipment

Sweden - TCO Requirements (Voluntary)

TCO (The Swedish Confederation of Professional Employees) has been involved in relevant environmental and user-friendly requirements for IT equipment since the 1980s. Their hazardous substance limits are as follows:

TCO Requirements	TCO'99 for displays	TCO'01 for mobile phones	TCO'03 for displays
Mercury (Hg) Cadmium (Cd)	Not contained in: <ul style="list-style-type: none"> Batteries Electric components CRT displays (Cd) 	Hg 2 ppm Cd 5 ppm	Hg 2 ppm Cd 5 ppm For paint, lacquer, contacts and solder in VDU
Lead (Pb)	No requirements	Pb 10 ppm	Pb 50 ppm For batteries, paint, lacquer, external cables, plastic materials and external adapters of VDU
Brominated and chlorinated flame retardants	Not contained in plastic components ≥ 25 g	0.05%	0.5%

USA Requirements

Model Toxics in Packaging Legislation of the USA

Originally drafted by the Source Reduction Council of CONEG (Coalition of North-eastern Governors) in 1989 to reduce heavy metals in packaging and packaging components throughout the US. The sum of the concentrations of lead, cadmium, mercury and hexavalent chromium shall be a maximum 100 ppm.

16 CFR 1303, Ban of Lead-containing Paint and Certain Consumer Products Bearing Lead-containing Paint

Paint and similar surface-coating materials used for toys, childrens' articles and furniture may have a maximum lead content of 0.06% by weight of the total nonvolatile content of the paint film.

California Proposition 65, Safe Drinking Water and Toxic Enforcement Act of 1986

This Act covers over 700 substances known to the State to cause cancer or reproductive toxicity. Prohibiting their discharge or release into water or onto land where such a substance passes or will probably pass into any source of drinking water. Consumer products require a clear warning label when containing these substances.

Appendix: Recommended test parameters, legal requirements and test methods

Substance	Metal	Plastic	Textile	Leather	Glass/Ceramic	Wood	Paper	Ink/Coating	Liquid	PCB	Legal Requirement	Limit	Test Method	Instrument
Heavy metals in packaging and packaging waste (Cd, Pb, Hg & Cr (VI))	•	•	•	•	•	•	•	•	•	•	94/62/EC CONEG	Cd+ Pb +Hg +Cr ^{VI} : 100 ppm	Cd, Pb, Hg: ICP-OES Cr ^{VI} : UV-VIS	ICP-OES
Heavy metals in batteries and accumulators (Cd, Pb & Hg)	•	•	•	•	•	•	•	•	•	•	91/157/EEC	Hg: 5 ppm Pb: 0.4%* Cd: 0.025%*	US EPA 3052	ICP-OES
Cadmium (Cd)	•	•	•	•	•	•	•	•	•	•	91/338/EEC Netherlands: Decree 1999 2002/95/EC	0.01% Banned (plating)	EN 1122 (plastics) EN 13346 US EPA 3052 & 3050B	ICP-OES
Lead (Pb)	•	•	•	•	•	•	•	•	•	•	2002/95/EC 16 CFR 1303	0.1% 0.06%	EN 13346 US EPA 3052/3050B	ICP-OES
Mercury (Hg)	•	•	•	•	•	•	•	•	•	•	89/677/EEC 2002/95/EC	Banned	US EPA 3052	ICP-OES
Chromium (VI) (hexavalent chromium Cr (VI))	•	•	•	•	•	•	•	•	•	•	1999/43/EC 2002/95/EC	Banned	US EPA 3060A & 7196A JIS-H-8625	UVA-VIS
Arsenic (As)	•	•	•	•	•	•	•	•	•	•	2003/2/EC	Banned	US EPA 3052/3050B	ICP-OES
Nickel (Ni) release	•	•	•	•	•	•	•	•	•	•	94/27/EC	0.5 µg/cm ² /week	EN 1811, EN 12472	ICP-OES
Polybrominated biphenyls (PBBs)	•	•	•	•	•	•	•	•	•	•	83/264/EEC 2002/95/EC	Banned	US EPA 3540C	GC-MSD HPLC
Polybrominated diphenyl ethers (PBDEs)	•	•	•	•	•	•	•	•	•	•	2002/95/EC 2003/11/EC (penta & octaBDE)	0.1%	US EPA 3540C	GC-MSD HPLC
Polychlorinated biphenyls (PCBs)	•	•	•	•	•	•	•	•	•	•	85/467/EEC 89/677/EEC	50 ppm	US EPA 8082	GC-MSD GC-ECD
Polychlorinated terphenyls (PCTs)	•	•	•	•	•	•	•	•	•	•	85/467/EEC 89/677/EEC	50 ppm	US EPA 3540C	GC-MSD GC-ECD
Polychlorinated naphthalenes (PCNs)	•	•	•	•	•	•	•	•	•	•			US EPA 3540C	GC-MSD
Short-chain chlorinated paraffins (SCCPs, C ₁₀ to C ₁₃)	•	•	•	•	•	•	•	•	•	•	2002/45/EC	1%	US EPA 3540C/GC-MSD	GC-MSD GC-ECD
Mirex	•	•	•	•	•	•	•	•	•	•	Regulation (EC) 304/2003	Not exported	US EPA 3540C	GC-MSD
Azocolourants	•	•	•	•	•	•	•	•	•	•	2002/61/EC	30 ppm	EN 14362-1 & 2 (fabric) CEN ISO/TS 17234 (leather)	GC-MSD HPLC
Asbestos	•	•	•	•	•	•	•	•	•	•	91/659/EEC 1999/77/EC	Banned	FHR analysis	FHR microscope
Pentachlorophenol (PCP)	•	•	•	•	•	•	•	•	•	•	1999/51/EC	0.1%	DIN 53313 (leather)	GC-ECD
Chlorofluorocarbons (CFCs) & Halons	•	•	•	•	•	•	•	•	•	•	Regulation (EC) No 2037/2000 GE: FC KW Halon VerbotstV USA: Clean Air Act	Banned	Tedlar collection & GC-MSD analysis	GC-MSD
Formaldehyde	•	•	•	•	•	•	•	•	•	•	GE: ChemVerbotstV	0.2%**	DIN 53315 (leather) ISO 14181-1 & 2 (fabric) EN 120 (wood)	UVA-VIS

* Labelling only ** In cleaning agents & polishes GE - Germany

Note: This is public domain information for reference only. Please contact your local Intertek office for clarification, updates and specific requirements of your respective customers.



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