



## **Green Environmental Program**

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### **Title**

#### **Introduction**

Keltron is embarking on a program to phase in lead free components and process for its products. This is in line with Keltron's Green Environmental Program and also in response to international legal developments (including but not limited to the European Union's WEEE and RoHS directives) that will act to restrict the use of lead (Pb) in electronic components, assemblies and other related components. To begin on the lead free journey, Keltron will collect all the information on lead free and manufacture in lead free process, technology, material that are in existence or being developed in the market.

### **Scope**

Keltron can supply electronic components, connectors, headers, sockets and cables on lead free or Environment-related Substances to be controlled on Jul 1<sup>st</sup> 2005.

### **Expectations from Keltron**

- We will provide customer a milestone chart or plan on how it intends to meet the timelines of the proposed legislative requirements for lead free.
- We will provide upfront information and regular updates on any cost impact of the parts due to lead-free conversion. Our supplier must work with Keltron to minimize the impact of such a conversion on cost and manufacturing during any transition periods.
- We will identify issues relating to quality, yield or long term reliability as early as possible and update our customer on that information.
- Lead free solder alloys and soldering processes are likely to result in higher assembly temperatures. We will develop components and product that are both lead free and can withstand these higher assembly temperatures. Note: plastic materials used in these components must also comply with the halogen free requirements of the new RoHS legislation.
- We will provide a product identification/part numbering plan to indicate which kind of metal alloy is used on a product in order to facilitate rework, repair and recycling and to reduce the likelihood of errors.





## **Green Environmental Program**

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### **Lead free – Affected EEE is not allowed to contain the following materials (Material groups)**

**Electric and **Electronic **Equipment** is defined as “EEE”****

- **Lead** exceptions as follows
  - Lead in glass from CRT (cathode ray tubes)
  - Lead in glass from fluorescent tubes
  - Lead in alloys of steel with a lead content up to 0.35 % weight
  - Lead in alloys of aluminum with a lead content up to 0.4 % weight
  - Lead in alloys of cooper with a lead content up to 0.4 % weight
  - Lead in solder with a high melting point, that means tin-lead solder alloy with more than 85 % (weight) lead
  - Lead in solder for servers, memory devises and storage-array systems (until 2010)
  - Lead in solder for network infrastructure equipment for signal transfer, signal processing, transmission and network management in the area of telecommunications
  - Lead in ceramic electronic components
  
- **Mercury** exceptions as follows
  - Mercury in compact fluorescent lamps with a maximum quantity of 5 mg per lamp
  - Mercury in fluorescent lamps for general use, with am maximum quantity of 10 mg (Halogen Phosphate), 5 mg (Triphosphate with normal life span), 8 mg (Triphosphate with extended lifespan)
  - Mercury in fluorescent tubes for special use
  - Mercury in other lamps
  
- **Cadmium** exceptions as follows
  - Cadmium surface coating, when not strictly forbidden by guideline 76/69/EWG.
  
- **Chrome (VI)** exceptions as follows
  - Chrome (VI) – compounds as corrosion protection for carbon steel for use in cooling systems in absorption refrigerators.
  
- **Polybrominated biphenyls (PBB)**
  
- **Polybrominated diphenyls (PBDE)**

## Green Environmental Program

### The following are groups of materials and limits of concentration

Antimony trioxide	
Arsenic and its compounds	
Lead and its compounds	[ ≥ 0.1 Grew. % ]
Polybrominated buphenyls and diphenyl ethers	[ ≥ 0.1 Grew. % ]
Cadmium and its compounds	[ ≥ 0.1 Grew. % ]
Chlorinated paraffins	
Chromium (VI) compounds	
Dibutylphthalate	
Bis (2-ethylhexy)phthalate (Diethylhexylphthalate, DEHP)	
Dimethylformamide (DMF)	
Synthetic mineral fibers classified as carcinogenic	
Mercury and its compounds	[ ≥ 0.1 Grew. % ]
Radioactive substances	
Beryllium and its compounds	
Sulfur hexafluoride (SF <sub>6</sub> )	

### General Material Requirements

Item	Testing Item	Plastic	Metal	Glass	Printin g	Paper	Ceram ic	Textile	Wood	Additi ve	Packin g Materi al	Application
1	Cadimium(Cd) Cadmium Compounds	*	*	*	*	*	*	*	*	*	*	Coloring agent, Stabilizer, Plating PVC Plasticizer
2	Lead(Pb) Lead Compounds	*	*	*	*	*	*	*	*	*	*	Colorant, PVC stabilizer, soldering, glass, Treatment, Lubricants
3	Mercury(Hg) Mercury Compounds	*	*	*	*	*	*	*	*	*	*	Preservatives, Pigments, Catalyst

## Green Environmental Program

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4	Hexavalent-Chromium(Cr6+ ) Compounds	*	*	*	*			*		*	*	Pigments, Inks, Catalysts, Plating, Tanning, Corrosion prevention, plating
5	PBB/PBDE	*			*			*		*		Flame retardants
6	Polychlorinated biphenyls(PCBs )	*			*			*		*		Lubricants, Heating medium, Oil for capacitors
7	Polychlorinated naphthalenes (PCN)	*			*					*		Lubricants, Preservatives, Paints
8	Chlorinated paraffins	*			*			*		*		Flame retardants, Plasticizer
9	Mirex	*			*			*		*		Pesticide
10	Formaldehyde							*	*			Used for wood, textile, leather as preservatives
11	Polyvinyl chloride(PVC) and PVC blends	*										
12	Organic Uncompounds	*			*							Insecticide
13	Asbestos	*										Insulators, Fibers
14	AZO compounds	*			*			*				Dyestuff
15	ODC										*	
16	TBBP-Abis	*			*			*		*		Flame retardants
17	Lead+Cd+Hg+Cr6 (or packing material)											
18	Battery content restrictions											

## Green Environmental Program

### Lead Free Plating Spec.

#### 1. Acceptable substitutes for finishes containing lead (Pb)

Acceptable substitutes for lead finishes on electrical components, heat sinks and printed circuit boards may include but are not limited to:

1. Fused tin (Sn) –with or without nickel (Ni) under plate
2. Tin (Sn) over nickel (Ni) underplate-one microns minimum thickness of nickel (Ni) is required. Less than one Micron Nickel (Ni) thickness requires Neltron approval.
3. Matte Tin (Sn) finishes with out a nickel underplate must meet the following requirements. : (note : annealing is not required with a nickel (Ni) underplate.)
  - 1) Matte Tin (Sn) finishes must meet the plating thickness greater than10 microns.
  - 2) The finish must undergo an annealing process at a temperature of 130 degrees Celsius or higher for a minimum of one hour.
  - 3) The heat treatment must occur with in two weeks of plating.
4. Tin-bismuth (SnBi) component finishes are only acceptable with specific Neltron approval.
5. Noble metal plating is acceptable without pre approval except for silver (Ag).
6. Silver (Ag) plating Require Neltron Pre-Approval.

#### 2. Unacceptable Substitutes for Finishes Containing Lead (Pb)

Unacceptable substitutes for lead (Pb) include but may not be limited to:

1. Bright and Shiny Tin
2. Pure Tin (Sn), Matte or Bright, without under plate(unless by specific Neltron approval) except for the matte tin finish with subsequent annealing process as referenced in section1 above.

#### 3. Criteria to Distinguish Between Pure Matte and Bright Tin

Supplier will establish a system to measure and to control characteristics of the tin plating known or suspected to influence whisker growth. Neltron requires carbon content 0.005% - 0.050%, Grain size 1-5um.

**Table 1. Distinguish Between pure Matte and Bright Tin**

	Matte Tin	Bright Tin
Grain Size	1 – 5 Microns	0.0 – 0.8 Microns
Carbon Content	0.005% - 0.050%	0.2% - 1.0 %

\*\* We reserve the right to alter this specification.



## Green Environmental Program

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SGS

### **TEST REPORT**

Report on the Submitted Samples Said to be: Connector & Cable

#### **1. Test Requested:**

1. To determine the Cadmium content in the submitted sample.
2. To determine the Lead content on the submitted sample.
3. To determine the Mercury content on the submitted sample.
4. To determine the Hexavalent Chromium content on the submitted sample.
5. To determine the Cadmium, Lead and Mercury content in the submitted metal sample.
6. Determination of the PBBs (Polybrominated biphenyl's). PBDEs (Polybrominated diphenethers) of the submitted sample.

#### **2. Standards for measurement:**

	Detection Limit
1. Cadmium (Cd)	<5ppm
2. Lead (PB)	<100ppm
3. Mercury (Hg)	<5ppm
4. Hexavalent Chromium (Cn5)	<5ppm
5. Polybrominated biphenyls (PBBs)	<5ppm
6. Polybrominated Diphenyl ethers(PBDEs)	<5ppm

#### **3. Test Results: Please refer to SGS job No report**

SGS Job NO: 1593009, 1593011, 1592988, 1594039, 1593014, 1593017,  
1594036, 1624095