

Adaptation to scientific and technical progress under Directive 2002/95/EC

Monthly Report 2
- final version -

Freiburg, 28 October 2005

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1 Background and Objectives

Article 4 (1) of Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment provides “that from 1 July 2006, new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, PBB or PBDE.” The annex to the Directive lists a limited number of applications of lead, mercury, cadmium and hexavalent chromium, which are exempted from the requirements of Article 4 (1).

Article 5 (1) (b) of the Directive provides that materials and components can be exempted from the substance restrictions contained in Article 4 (1) if their elimination or substitution via design changes or materials and components which do not require any of the materials or substances referred to therein is technically or scientifically impracticable, or where the negative environmental, health and/or consumer safety impacts caused by substitution outweigh the environmental, health and/or consumer safety benefits thereof.

On the basis of this provision the Commission has received (and is still receiving) from industry additional requests for applications to be exempted from the requirements of the directive. These requests need to be evaluated in order to assess whether the request for exemption fulfil the above mentioned requirements of Article 5 (1) (b). Where the requirements are fulfilled the Commission propose a draft decision amending the RoHS Directive.

Against this background Öko-Institut e.V. and Fraunhofer Institute for Reliability and Microintegration IZM have been commissioned by the Commission for technical assistance for the evaluation of requests for exemptions submitted according to Article 5 (1) (b). The main objective of this technical assistance consists in a clear assessment of whether the requests for exemptions are justified in line with the requirements listed in Article 5 (1) (b).

2 General Procedure

For details on the general procedure of the evaluation of the requests for exemption please refer to the first monthly report.

3 Scope

For a detailed description of the scope of the currently evaluated requests (set 1), please refer to the first monthly report. The consultation process for further requests is still ongoing. These requests will be considered in an evaluation of set 2 after closing the current stakeholder consultation round. Overlapping issues such as plasma display panels (consultation round 2) and LCD panels (consultation round 3) – both having the same PbO-containing glass but in different applications and partially with different functions – will be considered together in the course of set 2 evaluation.

No	Title of group	Current status
1	Lead in tin whisker resistant coatings for fine pitch applications	Close to final recommendation; minor clarifications still necessary. Meeting with industry scheduled.
2	Lead bound in glass, crystal glass, lead crystal or full lead crystal in general	Close to final recommendation; minor clarifications still necessary.
3	Chromium (also in oxidation state (VI)) and Cadmium as colouring batch addition each form up to a content of 2 % in glass, crystal glass, lead crystal or full lead crystal used as decorative and / or functional part of electric or electronic equipment	
4	Solders containing lead and/or cadmium for specific applications	Final recommendation possible for one request (see section 5.1); for other requests minor clarifications still necessary
5	Hexavalent chromium (CR VI) passivation coatings	Close to final recommendation; minor clarifications still necessary.
6	Lead in lead oxide glass plasma display panels	Close to final recommendation; because of overlapping issues scheduled for next report. Meeting with industry scheduled.
7	Lead in connectors, flexible printed circuits, flexible flat cables	Close to final recommendation; minor clarifications still necessary. Meeting with industry scheduled.
8	Lead oxide in lead glass, bonding materials of magnetic heads and magnetic heads	Not yet ready for recommendation; additional information required.
9	Cadmium as doping material in avalanche photodiodes (APDs) for the optical fiber communication systems	Request for exemption withdrawn by applicant / association (see section 5.2).

No	Title of group	Current status
10	Lead in optical isolators	Not yet ready for recommendation; additional information required.
11	Lead in sheath heater of Microwaves	Request for exemption withdrawn by applicant / association (see section 5.3).
12	Cadmium pigments except for applications banned under Directive 91/338/EEC amending Directive 76/769/EEC relating to the restriction on the marketing and use of certain substances	Final recommendation possible (see section 5.4).
13	High Intensity Discharge (HID) lamps for professional U.V. applications, containing lead halide as radiant agent	Final recommendation possible (see section 5.5).
14	Discharge lamps for special purposes containing lead as activator in the fluorescent powder (1% lead by weight or less)	Final recommendation possible (see section 5.6).
15	Discharge lamps containing lead in the form of an amalgam	Final recommendation possible (see section 5.7).
16	Mercury free flat panel lamp	Final recommendation possible (see section 5.8).
17	Special purposes Black Light Blue (BLB) lamps, containing lead in the glass envelope	Close to final recommendation; minor clarifications still necessary.
18	Low melting point alloys containing lead	Final recommendation possible (see section 5.9).
19	Galvanised steel containing up to 0.35% lead by weight and aluminium with an unintended lead content up to 0.4% lead by weight in electrical and electronic equipment	Final recommendation possible (see section 5.10).
20	Lead in solder and hexavalent chromium in surface treatment, in parts recovered from production printers and copying equipment, sold, rented or leased or otherwise returned from professional users other than private households, originally put on the market before 1 July 2006, and reused for the same purpose within the original manufacturer's closed loop system until 1 July 2011.	Final recommendation possible (see section 5.11).
21	Cadmium sulphide photocells	Close to final recommendation; minor clarifications still necessary.

4 Results

The first monthly report had stated that none of the requests for exemption was ready for final recommendation. In the meantime further information requested by Öko-Institut has been gathered and evaluated. The results of this evaluation are presented in this second monthly report.

As in the first monthly report an overview of the evaluation of each of the 33 requests for exemption is given in the checklists annexed to this report. Furthermore a detailed description of the requests ready for final recommendation is also given including the description of the request for exemption (substance, function, application, wording), the summary of the justification for exemption and a critical review of available data and information as well as the final recommendation by the contractor (see section 5).

5 Requests ready for final recommendation

The following requests could be evaluated with a view to final recommendation.

5.1 Solders containing lead and/or cadmium for specific applications (4b_Coherent)

Requested exemption

- Substance: lead and cadmium
- Volume: 13-17 kg Pb/a, 1 kg Cd/a (EU figures)
- Function: solders with high-precision thermo-mechanical properties and melting points specific for the processes used at Coherent
- Specific application: mirrors and lenses in high-precision laser equipment
- Precise wording: Lead and cadmium alloys as mechanical solder for optical components in high-precision laser equipment

Summary of justification for exemption

- Criteria for justification: currently, no substitute materials are known; design options, e.g. mechanical fixtures do not match with the high precision requirements; solders with a higher content of noble metals (Ag, In) "might be" a substitute; however, research on the feasibility of the potential alternatives has to be carried out; according to the applicant, this research would take two years and would have to be conducted by Coherent solely, as Coherent is the only user of the process; due to cost reasons, this research has not been carried out so far; furthermore, it was mentioned that the potential alternatives would have a higher environmental impact regarding energy consumption for raw material extraction and processing; however, this aspect could not be further specified or quantified by the applicant

- Critical review on data and information (given by applicant or other parties): no publicly information available

Final recommendation

- Assuming that the described laser equipment is actually covered by the RoHS Directive (depending on specific application being a large-scale stationary tool or not¹), this exemption request is not in line with Article 5 (1) b, as viable substitutes seem to be existent. Furthermore, it could not be proven that negative environmental impacts of the potential alternatives are likely to outweigh the environmental benefits of the substitution. The only reason given for the omission of research on the feasibility of the potential alternatives is cost-related, which is not compliant with Article 5 (1) b. Thus, this exemption request would have to be rejected when assessed only according to Article 5 (1) b.
- On the other hand, the rejection could imply that the manufacturing of the product would have to be discontinued at least until the potential substitutes are qualified, possibly forever. Therefore, as concession to the applicant, a moratorium according to the time-line (i.e. max. two years) of the research needed to check the feasibility of the potential alternatives is recommended. This concession is additionally supported through the low volume of the substances under request. The exact wording recommended being:

“Lead and cadmium alloys as mechanical solder for optical components in high-precision laser equipment for a limited period of two years”.

5.2 Cadmium as doping material in avalanche photodiodes (APDs) for the optical fiber communication systems

The JBCE (Japan Business Council in Europe) had requested an exemption for Cadmium as doping material in avalanche photodiodes (APDs) for the optical fiber communication systems. As the quantity of Cadmium contained in APDs is clearly lower than defined in the MCV-amendment (quantity including in one product: 1E-12 g; percentage by weight: 1E-3 %) JBCE decided to withdraw the request.²

¹ Large-scale stationary industrial tools do not fall under category 6, Annex IA WEEE Directive and would thus not be covered by RoHS.

² See e-mail Tatsuya Shibaoka (JBCE) 12/09/2005, Item No. 9 in Appendix 2

5.3 Lead in sheath heater of Microwaves

The JBCE (Japan Business Council in Europe) had requested an exemption for Lead in Sheath Heater of Microwave / Electric combination oven. In this application lead glass is used for protection on degradation of performance of electric insulation against humidity vaporized from hood during cooking.

Meanwhile JBCE decided to withdraw this exemption because “alternative technology will be in sight practically”.³ (However the question remains whether other applicants will request for exemption as “in some cases it will be still unforeseeable how many suppliers could cope well with this substitution”.)

5.4 Cadmium pigments except for applications banned under Directive 91/338/EEC amending Directive 76/769/EEC relating to the restriction on the marketing and use of certain substances

Requested exemption

The International Cadmium Association (ICdA) has requested an exemption for Cadmium pigments with the following wording:

“Cadmium pigments except for applications banned under Directive 91/338/EEC amending Directive 76/769/EEC relating to restrictions on the marketing and use of certain substances and preparations”.

Cadmium pigments (i.e. cadmium sulphide and cadmium sulphenide) are used in plastics (e.g. for casings), ceramics, glass, ceramics and glass coverings, enamels as well as in artist colours. The function of the cadmium in pigments is to provide colour (bright colours in the red to yellow range). The greatest proportion (about 90%) of the pigments are used in plastics.

Cadmium pigments are specially applied for colouring in certain applications since they fulfil the following criteria:

- Withstand high processing and service temperatures (esp. relevant for glasses, ceramic glazes and vitreous and porcelain enamels)
- Dispersion, non-migration and non-bleeding (esp. relevant for plastic applications where uniform colouring is important)

The total EU usage of Cd as a pigment is about 350 t/a for all applications. On further request ICdA could not specify the amount used in WEEE / RoHS relevant applications. The only figure available is that 27% are used for packaging and 26% for others. These two

³ See e-mail Tatsuya Shibaoka (JBCE) 12/09/2005, Item No. 11 in Appendix 2

categories encompass housings for electronic goods. The content of cadmium used as pigments for plastics is up to a maximum of 1%. The cadmium content used as pigments for ceramic coatings is up to 10%.

These figures are not significant enough to allow a statement on mass relevance of cadmium use in RoHS-relevant applications.

Summary of justification for exemption

Following criteria have been brought up for justification of the requested exemption by the applicant:

- Adding such an exemption to the annex of the RoHS Directive would ensure consistency in the European regulation on the use of cadmium pigments: scientific evaluation on risk of cadmium applications has already been done in the framework of Directive 91/338/EC and has led to restrictions on the marketing and use of cadmium pigments in certain applications. Hence in view of consistency there should be no further restrictions in other Community legislation.
- No single alternative (i.e. substitution/elimination) encompasses all of the following properties of cadmium pigments:
 - cover the whole area of the spectrum from red through to orange and yellow (i.e. correct hue)
 - clean bright opaque colours capable of being used to make clean bright secondary colours (e.g. green/browns, and for good tinting purposes (i.e. good opacity)
 - are stable at the processing temperatures of the polymer for which they are intended (i.e. heat stability). This in particular enables recycling of pigmented polymers at end-of-life.
 - are stable to light and weather during the life time of the product (i.e. lightfast and weather resistant)
 - do not vary because of the chemistry of the polymer nor are their physical properties affected (i.e. warpage or shrinkage)
 - provide identical colour in a wide range of different polymers (i.e. non metamerism matching)
 - are a cost effective polymer colouring
 - their uses have no adverse effect on levels of productivity or process efficiency
 - their safety during handling and polymer processing has been demonstrated.
- Risks associated with the cadmium pigment lifecycle (including incineration of waste) indicate no significant risk to man or to the environment.
- No risk assessments on the alternatives have been carried out

Following this argumentation and the critical review of the supporting information material made available by ICdA, the following evaluation can be given:

- It is not clear for what application cadmium pigments are necessary to their functionality (i.e. what are possible applications that need a corresponding colouring for their proper functioning – and not “only” for decoration purposes?) This leads to the fact that cadmium pigments could be replaced by either other colouring pigments not covered by RoHS or be left out completely (colourless applications).
- Furthermore some substitutes seem to exist: “Consequently, a wide range of alternatives would have to be used in place of cadmium pigments to cover the range of colours and stabilities (to heat, light, weather and migration). [...] However, some pigments have been developed. The suitability of alternative pigments varies according to the application. For some applications a close replacement can be found, but not for others. [...] the efficacy of organic pigments varies depending on the type of polymer used. [...] no suitable alternatives for ceramic applications (which make up a minor part of applications - < 10%).” (Wording ICdA)
- Since substitution possibilities at least exist for some applications, no general exemption for cadmium pigments can be granted based on the justification of a technologically not feasible substitution.
- Having no knowledge about possible adverse effects of available substitutes is not an argument in line with Article 5 (1) b. On the contrary, only proving such adverse effects could lead to a justified request for exemption.
- The fact that cadmium pigments might in general have only very little negative impacts on human health and the environment and thus should not be covered by RoHS is not subject of the present evaluation. The Commission has explicitly asked for technical support in evaluating the requests for exemptions according to Article 5 (1) b, meaning that questioning the sensibility of the general cadmium ban under RoHS cannot be evaluated at this stage.

Final recommendation

On the basis of the available request for exemption together with its supporting documentation no general exemption for cadmium pigments can be recommended. The argumentation line was neither sufficient to prove scientific or technological impracticability of elimination / substitution nor was it sufficient to give evidence on adverse environmental, health or safety impacts of possible substitutes.

The final recommendation for this request is thus not to exempt the use of cadmium pigments in general. A request for exemption concerning a certain functionality of cadmium pigments in specific applications could be evaluated in a more differentiated way.

5.5 High Intensity Discharge (HID) lamps for professional UV applications, containing lead halide as radiant agent

Requested exemption

The European Lamp Companies Federation (ELCF) requests an exemption for Pb in the form of PbI_2 as component in filling of certain High Intensity Discharge (HID) lamps. The function of PbI_2 consists in creating specific lines in emission spectrum of the lamp, necessary for several professional UV applications: curing, reprography, label printing industry. The total annual amount of PbI_2 in this application is about 10 kg (total EU market, 2004 figures).

Summary of justification for exemption

The applicant justifies the request technically: no substitutes are known that results in a comparable emission spectrum and efficacy. According to the applicant these lamps are mostly used for professional reprography applications (diazoprinting). The technology is old and is gradually being replaced by digital printing. The application is declining by about 10% per year. Therefore no new systems are built with this type of lamps. It is mostly replacement of end of life lamps. No design changes are planned for this reason.

Final recommendation

Basically this exemption request should be granted according to Article 5 (1) b, as no viable substitutes are existent. Furthermore it is predictable that for professional reprography due to technological changes redesigning processes or equipments is unlikely.

However the exemption should be restricted to those applications depending on the specific emission spectrum. In this context the question remains whether curing applications are depending on this specific emission spectrum.

Until clarification of this fact an exemption should be restricted as follows:

“Lead halide as radiant agent in High Intensity Discharge (HID) lamps used for professional reprography applications.”

Regarding the typical lifetime of HID lamps used for professional reprography applications the exemption should be restricted to a certain period, taking the remaining life-time of the professional reprography applications into account.

5.6 Discharge lamps for special purposes containing lead as activator in the fluorescent powder (1% lead by weight or less)

Requested exemption

The European Lamp Companies Federation (ELCF) requests an exemption for Lead activated UV emitting phosphors as used in low pressure Hg based fluorescent lamps. The lead containing solid phosphor matrix determines both effective UV-C absorption (from the low pressure mercury discharge) and effective generation of (mainly) UV-A emission.

Presently two applications for lamps containing lead as activator in the fluorescent powder are denominated by the applicant:

- Sun tanning lamps contain phosphors such as BSP ($\text{BaSi}_2\text{O}_5\text{:Pb}$), with an emission peak of 350 nm.
- Certain specialty lamps (applications: diazo-printing reprography, lithography, insect traps, photochemical and curing processes) contain the phosphors such as SMS ($(\text{Sr,Ba})_2\text{MgSi}_2\text{O}_7\text{:Pb}$), generating a broad emission peak centered at 360 nm.

The total annual amount of lead in these applications is approximately 600 kg (total EU market, 2004 figures).

Summary of justification for exemption

The applicant justifies the request for exemption considering several criteria:

- Technically: no substitutes are known that results in a comparable emission spectrum and efficacy. Both BSP and SMS replacement would result in to lower efficacy and less optimal spectrum.
- Environment: through lower efficacy energy demand of lamps increases (about 10%).
- Consumer safety: Sun tanning equipment and solar lamps have to comply with IEC 60335-2-27. In order to protect consumer safety, the IEC norm is in the process to be amended. This poses new restrictions on spectral output distribution, like a defined ration of NMSC weighed output measured above and below 320 nm (Working group MT16 in SC34a). One to one substitution of phosphor in the same application, while covering the total application range, is therefore highly unlikely.

Draft recommendation

Basically this exemption request should be granted according to Article 5 (1) b, as no substitutes are existent providing the lamp emission spectrum and lamp efficacy. Due to the considerable higher energy demand of lead-free UV emitting phosphor substitution would result in higher resource consumption and emissions form electric power generation incl. upstream material flows. Furthermore it is unlikely whether standards concerning consumer safety could be met with the lead-free substitutes.

However the exemption should be restricted to those applications for which lead as activator in the fluorescent powder is currently used. Against this background we suggest the following wording:

"Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP ($\text{BaSi}_2\text{O}_5\text{:Pb}$) as well as when used as speciality lamps for diazo-printing reprography, lithography, insect traps, photochemical and curing processes) containing phosphors such as SMS ($(\text{Sr,Ba})_2\text{MgSi}_2\text{O}_7\text{:Pb}$)."

5.7 Discharge lamps containing lead in the form of an amalgam

Requested exemption

The European Lamp Companies Federation (ELCF) requests an exemption for very compact Energy Saving Lamps (ESL) with PbBiSn-Hg and PbInSn-Hg in specific compositions as main amalgam and PbSn-Hg as auxiliary amalgam. These substances control the Hg - vapour pressure inside small compact fluorescent lamps (especially the types with a closed cover) stabilizing the light output and lamp efficacy over a wide ambient temperature range, which makes it possible to replace incandescent lamps by energy saving lamps in a wide range of applications, both indoor and outdoor. Energy Saving Lamps can only be made in GLS dimensions and shape when Pb-containing amalgam can be applied.

The total annual amount of lead in this application is about 300 kg (assuming that 15 Million out of 150 Million CFL-I lamps sold across Europe contain max. 20 mg Pb contained in amalgam (total EU market, 2004 figures).

Summary of justification for exemption

The applicant justifies the request for exemption considering several criteria:

- Technically: Alternative, Pb-free amalgams are not able to create optimum Hg pressure in ESL's with GLS-equivalent dimensions. Consequently either light output will be less when maintaining GLS dimensions, or product dimensions will be significantly bigger when maintaining the light output. This design change must be regarded as technically impracticable since not meeting consumer requirements.
- Environment:
 - Substitution to non-lead containing amalgams greatly limits the possibility to downsize CFL-I lamps to the size and shape of GLS bulbs (especially for the higher CFL-I wattages i.e. equivalents of 60/75/100W GLS lamps). Size reduction is vital for the acceptance of ESL's as replacement for GLS lamps.

- The conclusion of Life-Cycle Analysis is that most of the environmental impact of fluorescent lamps is generated in the usage phase. Substitution by non-lead containing products would lead to increased Hg and Pb emissions into the environment during electricity generation.
- Environment / Costs:
 - The exemption of Pb in amalgam of Compact Fluorescent enhances the opportunity to replace all incandescent lamps. Pb-containing amalgams enable size reductions up to 20% for GLS-shaped ESL), without negative cost implications. This eliminates one of the main reasons for non-users not to buy ESL's.

Final recommendation

Basically this exemption request should be granted according to Article 5 (1) b, as no substitutes are existent providing the functionality. Even this functionality is crucial in order to downsize CFL-I lamps to the size and shape of GLS bulbs and therefore to enlarge acceptance for Energy Saving Lamps.

Information delivered by the applicant is complete and comprehensible. However the exemption should be restricted for the time period the applicant mentioned to be necessary before alternatives without drawbacks will be released.

Against this background we suggest the following wording:

"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)."

5.8 Mercury free flat panel lamp

Requested exemption

The European Lamp Companies Federation (ELCF) requests an exemption for mercury free flat panel lamp assembled by using lead containing glass solder. The total annual amount of lead in this application is about 60 kg (total EU market).

Summary of justification for exemption

The applicant justifies the request for exemption considering several criteria:

- Technically: Mercury free flat panels without lead are not available. At present no lead-free glass solders/frits is available which can meet the process requirements. Development of lead free flat panel lamps could possibly be finished within a 2 years time frame, but the outcome of the lead-free frit development is not predictable.
- Environment: The panels are the first generation of mercury free flat panels; in case of breakage or at end of life there is no impact of mercury like on usual flat panels. The

lead used in glass solder and solder is not available for environment, because the system is closed and at end of life flat panels are recycled.

Final recommendation

Basically this exemption request should be granted according to Article 5 (1) b, as both no substitutes are existent providing the functionality and mercury containing flat panels would have an negative impact regarding consumer safety as well as environmental impacts.

Information delivered by the applicant is complete and comprehensible. However the exemption should be restricted for the time period necessary to develop a lead free technology. Furthermore the exemption should be related to the specific production process used for manufacturing mercury free flat panel lamps.

Against this background we suggest the following wording:

"Lead as glass solder typically with 70wt%PbO in mercury free flat panel lamps type PLANON."

5.9 Low melting point alloys containing lead

Requested exemption (applicant: Cookson Electronics):

- Substance: Pb
- Function: lowering melting point of the alloy, increase ductility
- Specific application: jumper lead (electrical connection between the EMI shielding layer an the top and bottom side of FR-1, FR-2 and CEM-1 PCB)
- Precise wording: Request for exemption for jumper leads consisting of low melting point alloys containing < 50 % lead

Summary of justification for exemption

- Criteria for justification: technical/scientific reasons, negative environmental and economic impact of alternative solutions
- Critical review on data and information (given by applicant or other parties)
 - alternative alloys with a similar melting point are available, but
 - in the case of Sn20In3Ag the costs increase as a multiple of 20 times and
 - in the case of SnBi the mechanical properties are insufficient.
 - alternative technologies were discussed, but there are various disadvantages::
 - in the case of the use of a Cu rivet the system is fault-prone in service due to deterioration caused by different thermal coefficients of expansion of Cu and the PCB, vibration and corrosion;
 - in the case of hand soldering of the joint between a Cu lead and the top side of the board (necessary if a higher melting point solder is used and the heat for

processing in the wave soldering process is not sufficient) an additional processing operation involving energy and process costs is necessary for very high quantities per year (70 million)

Final recommendation

Since technological alternatives do exist, it is recommended not to accept the request for exemption. Hand-soldering as an alternative to lead-free jumper leads has already been considered as the preferred alternative by the applicant. The other possible alternative is the use of the lead-free alloy Sn20In3Ag. Furthermore alternative technologies operating completely without solders are expected to be developed within the next ten years.

However, the authors would like to point out that negative environmental effects are expected in both cases:

- For hand-soldering a higher energy demand has to be expected.
- There are hints that the use of indium and gold as a substitute for lead could result in considerably higher environmental impacts. These impacts cannot be assessed since no detailed data or information on this issue was provided by the applicant or by any other party. A sound final recommendation would require a deeper investigation into the environmental impacts of gold-for-lead substitutions. From the authors' point of view it should be the common objective of industry and the Commission to acquire a sound understanding of this problem with consideration to substitution questions as raised in this exemption request. It is therefore suggested that public authorities together with industry commission a study on the environmental and safety effects of gold as a substitute for lead in order to allow publicly available information on this issue.

5.10 Galvanised steel containing up to 0.35% lead by weight and aluminium with an unintended lead content up to 0.4% lead by weight in electrical and electronic equipment

Requested exemption (applicant: Eurometaux)

- Substance: lead
- Function: not mentioned
- Specific application: weatherproof electrical cabinets, cable trays and similar (used at railside and mass transport systems)
- Precise wording: Galvanised steel containing up to 0.35% lead by weight and aluminium with an unintended lead content up to 0.4% lead by weight in electrical and electronic equipment

Summary of justification for exemption

- Criteria for justification: harmonisation with exemption 1 and 2 in Annex II of the ELV Directive; no further justification provided
- Critical review on data and information (given by applicant or other parties): no publicly information available

Final recommendation

- Aluminium with lead content up to 0.4% by weight is already exempted by RoHS Annex (entry no. 6)
- Applications mentioned (cable trays and cabinets) are not subject to RoHS (not mentioned in categories 1-7 and 10 of Annex 1B of WEEE Directive)

Thus, the exemption request is not applicable. If there were any other applications covered by RoHS that are relevant for the applicant a new request for exemption would be necessary.

5.11 Re-use of specific components in new production printers and copying equipment

Requested exemption

Xerox, Kodak and Océ requested the exemption of

- lead in printed circuit boards, actuators, sensors, motors, power supplies, bearings, optical glass and wiring harnesses, and
- hexavalent chromium in sheet metal for mainframes, subframes, rollers, bracketry and associated hardware

recovered from waste or used production printers and copying equipment returned from professional users other than private households, originally put on the market before 1 July 2006, and traceably reused for the same purpose within the original manufacturer's closed loop system until 1 July 2011.

The re-use of this organised by a reverse logistic process whereby the equipment remains the property of the manufacturer, or is subject to other contractual arrangements and is returned to the manufacturer either when the contract expires or the equipment reaches end-of-life for reuse, as defined in Art 3(d) of Directive 2002/96/EC.

Quantity: In a typical copier or printer found in commercial establishments, the percentage of lead is 0.03%, which equates to 0.12 kilograms and the percentage of hexavalent chromium is 0.001%, which equates to 0.004 kilograms for a typical machine with an average weight of 400 kilograms.

Summary of justification for exemption

The applicant justifies the request for exemption considering several criteria:

- Technically: The substances can be substituted in newly manufactured parts, but these parts have to be constructed entirely from new components and materials. There is no technically feasible process for eliminating lead and hexavalent chromium from recovered parts of the type included in this request, without destroying their integrity and functionality.
- Environment:
 - The reuse of the recovered parts containing lead and hexavalent chromium will not lead to any increase in the quantity of the substances entering the waste stream, it will merely delay their disposal. Within the closed loop system, the manufacturers are able to track and trace the history of each part, so ensuring that appropriate disposal is controlled and managed. The closed loop processes are ISO14001 certified.
 - Due to their reliability, recovered parts are fit for reuse for their original purpose in newly built production printers and copiers. Therefore there is no need to dispose of these parts prematurely and replace them with new parts that consume virgin materials and energy. Due to the complexity of the equipment and the associated disassembly process, the premature disposal of the parts containing lead and hexavalent chromium will lead to the premature disposal of whole copiers and printers containing the parts, not just the parts themselves.
 - Life cycle analysis methods have been used to develop the ecological profile for reuse of printers and copiers, and their early replacement. It is calculated that the early discarding of parts containing 0.12 kg of lead and 0.004 kg of hexavalent chromium in each machine (average weight of 400 kg) and the subsequent replacement with new parts will consume 16 GJ of energy and emit 860 kg of carbon dioxide per machine.

Final recommendation

Basically this exemption request should be granted according to Article 5 (1) b, as through the re-use negative environmental impacts could be avoided. Information delivered by the applicant is complete and comprehensible; there are similar results of other studies covering the re-use of complex electronic products. The existence and reliability of manufacturer's closed loop system should be certified by an independent third party.

The corresponding recommended wording is:

- *“lead in printed circuit boards, actuators, sensors, motors, power supplies, bearings, optical glass and wiring harnesses, and*
- *hexavalent chromium in sheet metal for mainframes, subframes, rollers, bracketry and associated hardware*

recovered from waste or used production printers and copying equipment returned from professional users other than private households, originally put on the market before 1 July 2006, and traceably reused for the same purpose within the original manufacturer's closed loop system until 1 July 2011."

6 Further proceeding

Regarding the 21 groups of the current set of requests for exemption, 7 groups are remaining in the status "close to final recommendation, minor clarifications are necessary" Due to the fact that two meetings with related industry or association are just scheduled it is foreseeable that these clarifications could be done within the next 4 weeks.

Appendix 1: Revised Checklist Requests Set 1

(See file ChecklistReport2_281005.pdf)

Appendix 2: E-mail by applicant cited in report

From: "Shibaoka" <shibaoka@jmceu.org>

To: <rohs@oeko.de>

Subject: Re-SENT The reply for RoHS Clarification needs concerning requests for Exemption

Date sent: Mon, 12 Sep 2005 17:42:40 +0200

Send reply to: shibaoka@jmceu.org

Dear Mr. Gensch,

JBCE, Japan Business Council in Europe hereby send our answers about your requested Items last week as follows,

A. Item No.1

Lead in tin whisker resistant coatings for fine pitch applications
(here: solder-lead-plating)

Instead of directry answer, we would like to express our current stand point.
At first, we do not ask the exemption on this issue any more. As you pointed out there has been a alternative for tin-lead plating. That is gold. The time for designing has run out we decided to use gold as a interim solution. However as we think using gold has some side effect on environment and workers, we are fighting to find better and actual alternative. We will also tell our intention to commision.

B. Item No.4

Solders containing lead and / or cadmium for specific applications
(here: Lead and cadmium in the thermal element for thermal cutoffs)

We will gather to withdraw this Item from exemption
Requests for RoHS 3rd Parckage

Reasons and additional explanation will be sent on 13 Sep (Tuesday).

C. Item No. 6 (PDP) & 6-2 (SED)

Lead in the glass of plasma and other technology large-sized flat display panels

Requested inquiry and data will be submitted by 16 Sep (Friday).
for Plasma Display Panels.

With regards to other technology large-sized flat display panel (SED from us),
please refer to attached file (item 6 2 SED reply and explanation)
Also, necessary additional technical data will be submitted by 16 Sep(Friday).

D. Item No. 9

Cadmium as a doping material in avalanche photodiodes (APDs) for the optical
fiber communication system

We have reached the resolution to withdraw this Item from exemption
Requests for RoHS 3rd Package

Reason: Commission has announced the definition of MCV in August.
The quantity of Cadmium contained APDS is clearly lower level than defined MCV.

E. Item No.11

Lead in sheath heater of microwave / electric combination oven

We have reached the resolution to withdraw this Item from exemption
Requests for RoHS 3rd Package.

Reason: Alternative technology will be in sight practically.
In some cases, it will be still unforeseeable how many suppliers could cope
well with the substitution.

Note: Your requested missing files for attachment No9 is for Item 9 (APDs),
which withdrew as above, not for Item 11.
Please refer to attached docs (Consultation No.9 Attachment)
only for your reference.

Best Regards

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Japan Business Council in Europe
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