



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

Response from EICTA and AeA Europe to the general and specific questionnaires

relating to exemption 8

"Cadmium and its compounds in electrical contacts and cadmium plating except for applications banned under Directive 91/338/EEC amending Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations"

Note: Please bear in mind that this paper relates only to those applications present in our products, whereas they may also be used in non-ICT products.

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General questionnaire

1. For which substance(s) or compound(s) should the requested exemption be valid?	Cadmium
2. What is the application in which the substance/compound is used for and what is its specific technical function?	Cadmium Oxide in the plating of electrical contacts
3. What is the specific (technical) function of the substance/compound in this application?	Prevent arcs when opening the contacts in case of high power / high current. Prevent corrosion of electrical contacts which would reduce durability and reliability.
4. Please justify why this application falls under the scope of the RoHS Directive (e.g. is it a finished product?	High-power / high-current switches are used e.g. in circuit breakers of servers, telecomm., and networking infrastructure equipment. Switches with cadmium plated electrical contacts are used in many Category 3 products including computers, printers, and copiers.
- Is it a fixed installation?	
- What category of the WEEE Directive does it belong to?).	EICTA products are belonging to Cat. 3 of the WEEE directive
5. What is the amount (in absolute number and in percentage by weight) of the substance/compound in:	
i) the homogeneous material	10% - 12% of Cadmium Oxide in the surface plating of contacts
ii) the application, and	Since cadmium oxide is only used in the surface plating of the actual contacts, the percentage of Cd in the circuit breaker is very small.
iii) total EU annually for RoHS relevant applications?	No estimate available
6. Please check and justify why the application you request an exemption for does not overlap with already existing exemptions respectively does not overlap with exemption requests covered by previous consultations.	Not applicable – this is only for new exemption requests
7. Please provide an unambiguous wording for the (requested) exemption.	As it is today - "Cadmium and its compounds in electrical contacts and cadmium plating except for applications banned under Directive 91/338/EEC amending Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations"
8. Please justify your contribution according to Article 5 (1). (b) RoHS Directive whereas:	
o Substitution of concerned	– for safety and durability/reliability reasons, AgCdO can not be replaced in most types of

hazardous substances via materials and components not containing these is technically or scientifically either practicable or impracticable;	electrical switches and circuit breakers
o Elimination or substitution of concerned hazardous substances via design changes is technically or scientifically either practicable or impracticable;	– for safety and durability/reliability reasons, AgCdO can not be replaced in most types of electrical switches and circuit breakers
o Negative environmental, health and/or consumer safety impacts caused by substitution are either likely or unlikely to outweigh environmental, health and/or consumer safety benefits thereof (If existing, please refer to relevant studies on negative or positive impacts caused by substitution).	Negative safety impacts, negative environmental impacts due to decreased lifetime. While laboratory data can be provided indicating equivalence of cadmium and non-cadmium contacts, laboratory testing is not a substitute for long term field experience and the new alloys have very limited exposure in the marketplace.
9. Please provide sound data/evidence on why substitution / elimination is either practicable or impracticable (e.g. what research has been done, what was the outcome, is there a timeline for possible substitutes, why is the substance and its function in the application indispensable or not, is there available economic data on the possible substitutes, where relevant, etc.).	Cadmium in contacts was exempted from the directive on October 21, 2005 because it was recognized that this material, in an oxide form, exhibits very good overall performance and has a low tendency to “weld” when exposed to the range of AC voltages and currents seen in typical applications. Moreover, this exemption was granted due to the lack of alternative materials that could exhibit similar levels of performance. We believe the basis for this exemption is still valid. In addition to the electrical variations, a thermal cutoff can be exposed to many environmental conditions, including temperature, humidity, and vibration, to name a few, for five, ten or more years - until it is called upon to activate. Long term exposure to these environmental conditions may impact contact properties, such as surface oxidation or mechanical welding, thereby influencing the ability of a thermal cutoff to function. The cadmium based contacts have a successful forty year record of accommodating the variety of electrical and environmental conditions seen in the marketplace. Absent any long term data to support the long term performance of the other materials, we believe silver cadmium oxide contact material is still required for a variety of electrical switching products, not just thermal cutoffs.
10. Please also indicate if feasible substitutes currently exist in an industrial and/or commercial scale for similar use.	No substitutes have been identified that meet the stringent safety requirements for switches and contacts.
11. Please indicate the possibilities and/or	EICTA does not have this information and its members are continuing to seek guidance from circuit

the status for the development of substitutes and indicate if these substitutes were available by 1 July 2006 or at a later stage.	breaker suppliers who have the best information.
12. Please indicate if any current restrictions apply to such substitutes. If yes, please quote the exact title of the appropriate legislation/regulation.	No restrictions are known to apply to substitute materials.
13. Please indicate benefits / advantages and disadvantages of such substitutes.	Disadvantages – worse welding behavior, resulting in safety problems.
14. Please state whether there are overlapping issues with other relevant legislation such as e.g. the ELV Directive that should be taken into account.	None of which we are aware.
15. If a transition period between the publication of an amended Annex is needed or seems appropriate, please state how long this period should be for the specific application concerned.	For producers of servers, telecommunications, and network infrastructure equipment, product lifecycles and supply chain considerations drive the need for 3 years to make a complete transition from the date when Cd-free technology becomes widely available.

Specific questionnaire

Questions	Comments
1. Please state whether you agree with the above cited conclusions of the previous evaluation or not and justify your statement. What has changed since 2006?	Although for some applications of Cadmium in Contacts there are technical alternatives, for some specific applications like high-power / high-current circuit breakers there is no technical alternative available. Other coatings do not guarantee the same safety regarding arc prevention even after aging of the contacts like Cadmium plated contacts.
2. Please specify exactly which applications are covered by this exemption. What is the technical function of cadmium in the applications?	<p>Silver cadmium oxide (Ag/CdO) is used as an arc resistant contact material in Circuit Breakers, etc. Cadmium Oxide in contact plating ensures low contact resistance, high wear resistance and high anti-weld characteristics, even after long lifetime.</p> <p>The majority of the concerned switches are used in the whole range of appliances affected by 'RoHS/WEEE'. The range of performance of the AC voltage (up to 400 V) fulfills a qualitatively unique feature for silver-cadmium-oxide contacts (AgCdO) at rated currents from 8 A and for brief current peaks up to about 180 A.</p> <p>This means that contacts made using AgCdO platings meet requirements for the intended application of the AC voltage, including the allowance for heating in use and the low tendency to "weld". This result cannot generally be achieved by an alternative material compositions, such as silver-nickel (AgNi) or silver-stannic-oxide (AgSnO₂).</p> <p>The tendency to "weld" is a safety risk because the switch contacts are subjected to very high thermal stress during closing and at high currents. Under such conditions, these switch contacts may irreversibly bond, so that opening of the switch is prevented. Such bonding must be avoided at all cost when using switches with safety functions.</p>
3. Please state the amount of cadmium used per application, the cadmium content in the homogeneous material, the annual production volume as well as the number of applications related to exemption 8 put on the EU market annually.	See pt. 5 of the general questions
4. Please justify whether and in which of these applications the use of cadmium and its compounds is still technically necessary and in which it can be substituted .	<p>A composite mixture of cadmium/silver-oxide is commonly used to give the optimum durability, safety and performance of electrical contacts. The proportion of cadmium varies according to the electrical current rating of the control device. In our opinion, there are no feasible alternative materials available that have the same durability. Since durability is essential for the safety of the products, which these devices control, this exemption is vital.</p> <p>Regarding one-shot devices, alternative substitute materials may be available for thermal fuse links, which do not have contacts. However, for devices with contacts, such as non-self-resetting thermal cut-out components, the durability provided by cadmium in these contacts is necessary to ensure that they will function when required.</p>

5. Please describe the research and other efforts to replace cadmium and its compounds in the applications in which you still consider it as irreplaceable.	Unfortunately, we do not have such information available. We are very much relying upon material and component manufacturers for this information. Hopefully they are able to provide you with detailed information.
6. Please provide a roadmap with activities, milestones and timelines towards the replacement of cadmium in these applications	Unfortunately, we do not have such information available. We are very much relying upon material and component manufacturers for this information. Hopefully they are able to provide you with detailed information.
7. Assuming the current exemption will be given an expiry date , what date do you think is technologically feasible for industry?	No expiry date should be given at this time. The exemption will be needed for the foreseeable future, since no adequate substitute has yet been identified for all applications.
8. If you do not agree with the wording proposed during the last evaluation, please propose a new wording and justify your proposal.	The wording should remain as it currently is.