



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

Joint response from EICTA and AeA Europe, to the general and specific questionnaires

relating to exemption 13 - 'Lead and cadmium in optical and filter glass.'

4 April 2008

<u>Content</u>	
General questionnaire	p. 2
Specific questionnaire	p. 5

# General questionnaire

Note: 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. You may need to add a foreword to this effect.

Note: Information already given in former consultations should not be repeated in detail. The amount of information per exemption may vary between 2 – 6 pages depending on exemption history. Make use of Annexes.

1. For which substance(s) or compound(s) should the requested exemption be valid?	Lead and Lead Oxide in optical glass. Cadmium and CdS and CdCO <sub>3</sub> in optical glass and filters
2. What is the application in which the substance/compound is used for and what is its specific technical function?	The applications are for scanners, printers, professional lenses, band-pass filters, gradient index glass rod lens array (SELFOC Lens Array: SLA), gradient index glass rod lens (SELFOC Rod lens: SRL), optical filter for skin treatment devices and GRIN lenses for passive optical components in telecommunications. Lead is on the surface of or in optical glass lens – surface coating of plate glass in scanners and barcode scanners for transfer of images. Cadmium in the infrared transmittable filter glass, laser scanners and scan engines for barcode reading applications.
3. What is the specific (technical) function of the substance/compound in this application?	<p>Lead in lenses:</p> <ul style="list-style-type: none"> <li>- excellent optical properties: high resolution, color neutrality, high contrast</li> <li>- improves lens MTF (modulation transfer function)</li> <li>- high refractive index combined with good blue, violet and UV transmission and /or special dispersion properties of glass for color correction</li> <li>- special wavelength transmission properties (filter effect)</li> <li>- for movement control of alkali ions in the ion-exchange process, through which gradient index glass rod lenses are manufactured</li> <li>- lower melting point and control of refractive index.</li> </ul> <p>Cadmium</p> <ul style="list-style-type: none"> <li>- reduces the ambient noise by using sharp absorption property from red color glass substrate Ref: <a href="http://www.optical-filters.com/rg645.html">http://www.optical-filters.com/rg645.html</a> and <a href="http://www.optical-filters.com/rg630.html">http://www.optical-filters.com/rg630.html</a></li> <li>- controls or selects the region of light allowed to pass, prevents specific wavelengths from passing through the filter.</li> </ul>
4. Please justify why this application falls under the scope of the RoHS Directive (e.g. is it a finished product?	Lead and Cadmium materials are part of the six hazardous materials specified by RoHS committee
- Is it a fixed installation?	Applications may be fixed or portable depending on the device.
- What category of the WEEE Directive does it belong to?).	The applications are optical lenses used mainly for copiers, scanners, printers (SLA), GRIN lenses, laser scanners, and medical/industrial endoscopes (SRL) which belong to the category 3. IT and Telecommunications Equipment" (SLA) and lasers as well as gas chromatograph detectors in category "9. Monitoring and control instruments" (SRL) 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	(1) SLA : 0.01-22 g/pce, 1-13 wt% (depending on types of products), about 2 tons (annually for EU).
ii) the application, and iii) total EU annually for RoHS relevant applications?	(2) SRL : 0.001-1 g/pce, 20 wt% (depending on types of products), about 50 g (annually for EU).
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.	<i>Not applicable – this is only for new exemption requests</i>
7. Please provide an unambiguous wording for the (requested) exemption.	Lead and Cadmium in optical and filter glass
8. Please justify your contribution according to Article 5 (1). (b) RoHS Directive whereas:	
<ul style="list-style-type: none"> <li>• Substitution of concerned hazardous substances via materials and components not containing these is technically or scientifically either practicable or impracticable;</li> </ul>	Lead – technically impractical for high resolution, performance applications at this time. Cadmium – Technically impractical at this time.
<ul style="list-style-type: none"> <li>• Elimination or substitution of concerned hazardous substances via design changes is technically or scientifically either practicable or impracticable;</li> </ul>	See Item 3 for specific properties. Lead – Impractical for high resolution, performance applications at this time. Cadmium – When you reduce the amount of or remove the Cadmium material, the red color property will be changed, altering the performance adversely.
<ul style="list-style-type: none"> <li>• 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).</li> </ul>	For bulky color glass substrate, the Cadmium material is nearly impossible to remove and create any harm to the environment or human beings.
9. Please provide sound data/evidence on why substitution / elimination is either practicable or impracticable (e.g. what	For SLA / SRL / GRIN: Without lead, we cannot obtain a good parabolic distribution of alkali ion concentration for lenses with larger diameter, and cannot control the timing to stop the ion-exchange process for lenses with smaller diameter due to the too fast movement of alkali ions.

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.).	SLA-12D is an exceptional case in which those problems of the lead-free version could be barely balanced and required resolution level for SLA-12D is relatively low. Where for consumer-oriented applications glasses and filters have been developed, however not all the properties could be maintained as before with lead and cadmium. For industrial, commercial and scientific applications the property differences are essential for critical functions.
10. Please also indicate if feasible substitutes currently exist in an industrial and/or commercial scale for similar use.	None at this time.
11. Please indicate the possibilities and/or the status for the development of substitutes and indicate if these substitutes were available by 1 July 2006 or at a later stage.	Development of a lead-free version of SLA-12D started before 1 July 2006. It will take considerable time to achieve a good parabolic distribution of alkali ion concentration for larger diameter lenses mentioned in Nr.9 and their lead-free versions will not be available before the year 2014, though we expect to solve the problem for smaller diameter lenses mentioned in Nr.9 somewhat earlier.
12. Please indicate if any current restrictions apply to such substitutes. If yes, please quote the exact title of the appropriate legislation/regulation.	Not applicable
13. Please indicate benefits / advantages and disadvantages of such substitutes.	Lead-free SLA (Self-focusing Lens Array) has been developed, but their performance are not equivalent to the lead-containing lenses. No substitutes for Cadmium applications have been found.
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.	Not applicable. We are not aware of any other relevant legislation.
15. If a transition period between the publications of an amended Annex is needed or seems appropriate, please state how long this period should be for the specific application concerned.	Not applicable
16. Additional comments	<i>This section was added by EICTA to capture any important comments that did not fit under any of the above questions.</i>

## Specific questionnaire

Note from OKO:

In the context of the previous evaluation in 2004, it was concluded that “most optical glass and optical filters do not require lead or cadmium” although for a small number of specific applications lead and cadmium were required since substitutes could not meet all necessary characteristics provided by lead and cadmium.

<p>1. Please specify these small number of applications (differentiate between applications using optical glass and those using filter glass): which applications currently fall under the scope of the RoHS Directive? Please provide a <b>comprehensive list</b> with allocation to WEEE (Directive 2002/96/EC) categories. Which applications fall under category 8 &amp; 9 of the WEEE Directive? Which applications are covered by exemption 5 (“lead in glass of cathode ray tubes, electronic components and fluorescent tubes”)?</p>	<p>The applications are for scanners, printers, professional lenses, band-pass filters, gradient index glass rod lens array (SELFOC Lens Array: SLA), gradient index glass rod lens (SELFOC Rod lens: SRL), and GRIN lenses for passive optical components in telecommunications. Lead is on the surface of or in optical glass lens – surface coating of plate glass in scanners and barcode scanners for transfer of images. Cadmium in the infrared transmittable filter glass, laser scanners and scan engines for barcode reading applications. Specific cadmium substrates include Schott RG645 and RG630 in laser scanner products.</p> <p>These applications are optical lenses used mainly for copiers, scanners, printers (SLA) and medical/ industrial endoscopes (SRL), which belong to the category "3. IT and Telecommunications Equipment" (SLA) and lasers as well as gas chromatograph detectors in category "9. Monitoring and control instruments" (SRL) of the WEEE Directive.</p>
<p>2. Which of the applications covered by exemption 13 are available as RoHS <b>compliant products</b> (i.e. without lead and cadmium) on the EU market? Which applications are currently not available as RoHS compliant products?</p>	<p>Imaging based barcode reader products are all RoHS compliant, where laser based barcode reader products require the RoHS Exemption 13.</p> <p>Lead-free SLA (Self-facing Lens Array) have been developed, but their performance are not equivalent to the lead-containing lenses. Optical systems of low or medium quality performance levels are inadequate for professional and industrial applications requiring greater repeatability and overall performance. This also includes lead on or in optical glass lenses for scanners.</p>
<p>3. Are there different <b>technical characteristics</b> between optical and filter glass? If so, what are the different technical functionalities of lead and cadmium in these types of glasses?</p>	<p>To properly control the movement of alkali ions in the ion-exchange process, through which gradient index glass rod lenses are made, in addition to general functions of lead in glass, namely to lower the melting point and to raise the refractive index.</p>
<p>4. Which are the technical characteristics related to the use of lead and cadmium that are essential for the <b>technical functionality</b> of applications / products related to exemption 13? List those applications named under point 1 for which substitution is technically not</p>	<p>Lead</p> <p>Superior functionality for scanner, LED-printer and Laser Printer</p> <p><u>Lens glass</u></p> <ul style="list-style-type: none"> <li>- excellent optical properties (high resolution, color neutrality, high contrast)</li> <li>- high refractive index combined with good blue, violet and UV transmission and/or special dispersion properties of glass for color correction)</li> </ul>

feasible and justify.	<ul style="list-style-type: none"> <li>- special wavelength transmission properties(filter effect)</li> </ul> <p><u>Filter glass</u></p> <ul style="list-style-type: none"> <li>- IR filters are absolutely vital for the visualization of environmental damages</li> <li>- Industrial image processing such as digital and scanning technologies, process monitoring and quality assurance. Red filters / IR filters and to a certain extent UV filters are indispensable for the operation of advanced image processing systems for a wide range of applications. Only the use of suitable filters can guarantee the quality standard required.</li> </ul> <p>Cadmium</p> <p>The optical band-pass property is used to reduce the ambient noise.</p> <ul style="list-style-type: none"> <li>- The absorption property from the red color glass substrate (like Schott RG645 and RG630) reduces the ambient noise getting into the laser scanner system.</li> </ul> <p style="padding-left: 40px;">Clear glass substrate (which is RoHS complaint), increases system noise by about 45%, which in turn reduces the barcode reading performance significantly.</p> <ul style="list-style-type: none"> <li>- Photo scanners: a UV/IR blocking filter containing cadmium is required in the optical system of these scanners.</li> </ul>
5. What has changed since the <b>last evaluation</b> in 2004? What is the current status of <b>R&amp;D efforts</b> towards substitution of lead and cadmium in the different applications?	For SLA / SRL / GRIN: it will take much time to achieve a good parabolic distribution of alkali ion concentration for larger diameter lenses mentioned in Nr.9 and their lead-free versions will not be available before the year 2014, though we expect to solve the problem for smaller diameter lenses mentioned in Nr.9 somewhat earlier.
6. Are manufacturers still <b>investigating alternatives</b> ? a. If yes, please provide a <b>roadmap</b> or similar evidence showing until when they intend to replace lead in glass in the applications mentioned above. b. If no, please explain and justify why no further research has been undertaken against the background that the RoHS Annex is subject to regular revisions.	Companies are investigating and developing lead-free SLA with the same level of performance (high resolution, color neutrality, and high contrast) as the lead lenses. Lead-free SLA are not expected to be commercially available for evaluation before 2014.
7. Please state for applications name under point 1 the <b>amount of lead and cadmium</b> used per application, the lead content in the homogeneous material, the annual production volume as well as the number of	(1) SLA : 0.01-22 g/pce, 1-13 wt% (depending on types of products), about 2 tons (annually for EU). (2) SRL : 0.001-1 g/pce, 20 wt% (depending on types of products), about 50 g (annually for EU).

applications related to exemption 13 put on the EU market annually.	
---	--