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

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

Exemption #3 (Mercury in straight fluorescent lamps for special purposes and #4) or 4 (Mercury in other lamps not specifically mentioned in this Annex)

Disclaimer: This document only provides information on RoHS exemption used in the IT and CE industry. All other applications of this exemption are not covered.

31. March 2008

Content

General questionnaire

1. For which substance(s) or compound(s) should the requested exemption be valid?	Hg (Mercury)
2. What is the application in which the substance/compound is used for and what is its specific technical function?	Hg in cold cathode fluorescent lamps (CCFL) used in of high depth-of- focus scanning devices, including transparent material scanning.
3. What is the specific (technical) function of the substance/compound in this application?	Mercury is used in fluorescent lamps as part of the light generating process. When power is applied to the bulb electrons move between the electrodes in the bulb. These will collide with the mercury and excite the atoms and move electrons to a higher energy state. When the electrons drop their energy level they emit ultraviolet light. The ultraviolet light strikes the phosphors coating on the bulb and excite their atoms and move electrons to a higher energy state. When their electrons drop their energy level, the bulb emits white light. Mercury is a key substance in creating light in fluorescent bulbs. Mercury containing cold-cathode fluorescent lamps (CCFL) are used in high depth-of-focus scanners (including transparent materials scanning) and as backlights in notebooks and LCD displays.
4. Please justify why this application falls under the scope of the RoHS Directive (e.g. is it a finished product?	Finished products for application are covered by RoHS.
- Is it a fixed installation?	None of the products using the application described above are fixed installations.
- What category of the WEEE Directive does it belong to?).	All products using the application described above are in category 3. IT and telecommunications equipment of WEEE.
5. What is the amount (in absolute number and in percentage by weight) of the substance/compound in:	
i) the homogeneous material[1]	CCFL in high depth-of-focus scanning devices: 1.0 to 3.3mg Hg per lamp assembly
ii) the application, and	CCFL in high depth-of-focus scanning devices:1.0 to 3.3 mg of Hg per lamp; 1 to 4 lamps per scanning product; Hg is ~ 0.03% by weight of lamp assembly
iii) total EU annually for RoHS relevant applications?	Lamps in high depth-of-focus scanning devices: ~6.0kg
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.	The applications described above fall in RoHS exemption 3 (Mercury in straight fluorescent lamps for special purposes).
7. Please provide an unambiguous wording	Mercury in straight fluorescent lamps for special purposes (RoHS exemption #3)

for the (requested) exemption.	
8. Please justify your contribution according to Article 5 (1) (b) RoHS Directive whereas:	
o Substitution of concerned hazardous substances via materials and components not containing these is technically or scientifically either practicable or impracticable;	Substitution of another material to replace Hg in CCFL's is not technically or scientifically feasible. Industry does not expect Hg to be replaced in CCFL's, rather it expects CCFL's to be replaced by LED arrays when they are developed to the point of providing the necessary quantity and quality of light required for high depth-of field scanning. Xenon lamps are not considered a viable substitution due to their large size and the fact they consume 5-6 times more power than CCFL's.
o Elimination or substitution of concerned hazardous substances via design changes is technically or scientifically either practicable or impracticable;	Elimination or substitution via design changes is not technically or scientifically practicable. See above.
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).	On the subject of substitution see above. The only currently available alternative light source for high depth-of-focus scanning devices is the xenon lamp. Xenon lamps would result in negative environmental impacts due to their physical size and power consumption characteristics. Xenon lamps are approximately 4 times greater in diameter than CCFL's (see attached photo). The use of xenon lamps would result in physically larger products which would consume more resources. Xenon lamps also consume 5 to 6 times more power than a CCFL.

	 Xenon lamp on top, CCFL on bottom, scale is 300mm LED arrays do not contain Hg and are usually very energy efficient. When LEDs are developed to the point of providing the quantity and quality of light needed they will likely use a comparable or lesser amount of power relative to CCFL's.
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.).	For any optical lens, such as that in a scanner, there is an inverse relationship between its depth-of-focus and the light gathering capability (aperture size). Therefore, a scanning system with a high depth-of-focus requires a very bright light source. Uniformity of light is equally important. Xenon lamps are the only current alternative to CCFL's and are not a practicable alternative due to the environmental impacts outlined above. Currently available LED arrays cannot provide the quantity and quality of light required for high depth-of-focus scanning. With the current LED technology multiple arrays would be required which would use considerably more power than the equivalent CCFL. Use of multiple LED arrays would require the addition of heat sinks and fans to mitigate heat, would present considerable physical

	design challenges, and would still not provide the light quality required. Industry is actively developing and commercializing LED technology for scanning applications. We fully expect a viable LED alternative to Hg containing CCFL's to be available in about 6 years.
10. Please also indicate if feasible substitutes currently exist in an industrial and/or commercial scale for similar use.	See above for xenon lamps. LED arrays are currently used in low depth-of-focus scanning applications.
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.	Xenon lamps were available prior to 1 July 2006; suitable LED technology will be available in the future. Suitable LED alternatives are expected to be available in about 6 years.
12. Please indicate if any current restrictions apply to such substitutes. If yes, please quote the exact title of the appropriate legislation/regulation.	None known.
13. Please indicate benefits / advantages and disadvantages of such substitutes.	Again, xenon lamps do not contain Hg but are much larger and use much more power than a CCFL. LED's do not contain Hg and are energy efficient but cannot yet provide the technical performance required.
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.	There are Hg reporting and labeling requirements in the USA and the WEEE Directive specifies Hg lamps must be separated prior to a mechanical treatment process.
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.	As indicated in our answers to the specific questions below, industry is working towards elimination of Hg containing CCFL over time. However, a transition period would be required for any change to the wording of this exemption.
16. Additional comments	See also Annex.

Specific questionnaire

1. Please specify the different **lamp types that use mercury**, including the technology used, the amount of mercury contained (also mercury per burning hour), the function of mercury in the lamp, the lifetime of the lamp and its energy consumption.	Hg in cold cathode fluorescent lamps (CCFL) of high depth-of-focus scanning devices. Cold cathode fluorescent lamps for high depth-of-focus scanning devices typically contain between 1.0 and 3.3mg Hg per lamp. Function of the Hg- Mercury is used in fluorescent lamps as part of the light generating process. When power is applied to the bulb electrons move between the electrodes in the bulb. These will collide with the mercury and excite the atoms and move electrons to a higher energy state. When the electrons drop their energy level they emit ultraviolet light. The ultraviolet light strikes the phosphors coating on the bulb and excite their atoms and move electrons to a higher energy state. When their electrons drop their energy level, the bulb emits white light. Mercury is a key substance in creating light in fluorescent bulbs. Lifetime: 10,000 hours Energy consumption: 4 to 5.5W
2. What is the total **amount of mercury** put on the market in the EU annually and currently in use for each of these different mercury-using lamp types?	Lamps in high depth-of-focus scanning devices: ~6kg annually
3. For which of these lamp types is the use of **mercury avoidable** (e.g. through substitution of the substance itself or through use of other lamp technologies not containing mercury)? Where has a reduction of the amount of mercury or a full substitution already begun or been completed? Please describe alternatives in (technical) detail.	The use of Hg in CCFL's is not avoidable. Industry does not expect a reduction in the amount of Hg in CCFL's. Rather, industry expects to eventually utilize LED technology to replace CCFL's in high depth-of-focus scanning devices. LED arrays are currently used in low depth-of-focus scanning devices such as those which utilize Contact Image Sensor (CIS) scanning technology. CIS scanners require an order of magnitude less light than high depth-of-focus scanners and produce considerably lower image quality. Currently available LED arrays cannot provide the quantity and quality of light required for high depth-of-focus scanning. Xenon lamps can provide the quantity and quality of light required, however, xenon lamps would result in negative environmental impacts due to their physical size and power consumption characteristics. Xenon lamps are approximately 4 times greater in diameter than CCFL's (see attached photo). The use of xenon lamps would result in physically larger products which would consume more resources. Xenon lamps also consume 5 to 6 times more power than a CCFL.
4. Please specify the **maximum amount of mercury** contained in each lamp type today and how it will decrease over time due to technological progress. Support your	Lamps in scanning devices: 1.0 to 3.3 mg Hg per lamp. Industry does not expect the amount of Hg per lamp to decrease. Rather, industry expects the CCFL to be replaced by LED technology which is the best not yet available technology.

statement with appropriate documentation such as a roadmap or results of tests and research activities. What is the currently best available technology with regard to lowest mercury content in each lamp type?	
5. Please provide appropriate information on the **benefits of the use of mercury** in lamps, compared to lamps not using mercury; especially with regard to energy savings and hence reduction of mercury emissions during electricity production.	CCFL's are very energy efficient. Put another way, CCFL's provide the most light for the least energy. Xenon lamps typically consume 5-6 times the power of CCFL's. When LED's are developed to the point of providing the quantity and quality of light needed they will likely use a comparable or lesser amount of power relative to CCFL's.
6. Assuming that in the EU a **total phase-out of mercury** is possible for the use in lamps, please specify until when such a phase-out would be completed for which application.	We fully expect an LED alternative to Hg containing CCFL's for high depth-of-focus scanning applications to be available in 2014.
7. Assuming that the existing exemptions do not anymore reflect the status of best available technologies and that an exemption for the use of mercury in lamps in future would only be limited to very specific cases, please provide a **wording proposal** (which may also include an expiry date for the exemption of a certain application).	To be determined.
8. Please provide an opinion on the recommendations for limits of mercury content included in the preparatory studies for **implementing measures** under the Ecodesign framework Directive (2005/32/EC, "EuP").	Not applicable to Hg exemptions for high depth-of-focus scanning applications.

Annex

Comparison Table of Lamps

Light Source	Size		Output (Light intensity)	Emission Efficiency	Life span (Light intensity down)		Other Requirements
	Lamps	Circuit boards					
Fluorescence Lamp (FL)	thin (2.4mm diameter)	middle	40,000cd / m2	-	long	-	-
Xe Lamp	thick (10mm diameter)	large	40,000cd / m2	1/3 - 1/4 of FL	short 1/10 of FL		-It is impossible to make it thinner. (light intensity down) - Vendors are limited.
LED	small	small	6,000cd / m2	1/3 - 1/4 of FL			In case of scanners other than CIS type, linearity of lamps are not enough.

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31. March. 2008

Content

General questionnaire

1. For which substance(s) or compound(s) should the requested exemption be valid?	Hg (Mercury)
2. What is the application in which the substance/compound is used for and what is its specific technical function?	Mercury high-intensity discharge (HID) lamps for projectors.
3. What is the specific (technical) function of the substance/compound in this application?	Electrons radiated from an electrode collide with mercury atoms and the mercury atoms radiate light.
4. Please justify why this application falls under the scope of the RoHS Directive (e.g. is it a finished product?	Finished products for this applications are all covered by RoHS.
- Is it a fixed installation?	None of the products using the application described above are fixed installations.
- What category of the WEEE Directive does it belong to?).	All products using the application described above are in category 3. IT and telecommunications equipment of WEEE.
5. What is the amount (in absolute number and in percentage by weight) of the substance/compound in:	
i) the homogeneous material	Amount of Hg in a lamp: 30 mg
ii) the application, and	Shipping amount to EU: 70 kg / year
iii) total EU annually for RoHS relevant applications?	Using amount in EU: 190 kg/year
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.	The applications described above all fall in RoHS exemption 4 (Mercury in other lamps not specifically mentioned in this Annex).
7. Please provide an unambiguous wording for the (requested) exemption.	Mercury in other lamps not specifically mentioned in this Annex (exemption #4)
8. Please justify your contribution according to Article 5 (1) (b) RoHS Directive whereas:	Since no substitutes have yet been discovered, it is unlikely that such invention and subsequent reduction to practice can occur within four years.
o Substitution of concerned hazardous substances via materials and components not containing these is technically or scientifically either practicable or impracticable;	For HID lamp, Hg is necessary because of proper lamp voltage and lamp efficiency. There are some candidates for substitutes such as Xenon lamp, LED and Laser, but they have their own weak points. Please see Appendix.

o Elimination or substitution of concerned hazardous substances via design changes is technically or scientifically either practicable or impracticable;	No substitutes for mercury high-intensity discharge (HID) lamps for projectors available.
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).	For HID lamp, mercury is necessary because of proper lamp voltage and lamp efficiency. The candidates for substitutes increase in size of projector and electric power needed.
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.).	Mercury-free HID lamps for automotive headlamps (metal halide lamps) have been developed, but their emission efficiencies are too low for projector lamps.
10. Please also indicate if feasible substitutes currently exist in an industrial and/or commercial scale for similar use.	No substitutes for Mercury high-intensity discharge (HID) lamps for projectors available.
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.	Since no candidates have yet been discovered, it is unlikely that such invention and subsequent reduction to practice can occur within four years.
12. Please indicate if any current restrictions apply to such substitutes. If yes, please quote the exact title of the appropriate legislation/regulation.	
13. Please indicate benefits / advantages and disadvantages of such substitutes.	
14. Please state whether there are	Similar exemption under the ELV Directive: Exemption no. 15 "Discharge lamps which contain

overlapping issues with other relevant legislation such as e.g. the ELV Directive that should be taken into account.	mercury and instrument panel displays"
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.	No substitutes for Mercury high-intensity discharge (HID) lamps for projectors available.
16. Additional comments	See also Annex

Specific questionnaire

1. Please specify the different **lamp types that use mercury**, including the technology used, the amount of mercury contained (also mercury per burning hour), the function of mercury in the lamp, the lifetime of the lamp and its energy consumption.	Mercury high-intensity discharge (HID) lamps for Projectors Mercury content: 30mg Functions: Electrons radiated from an electrode collide with mercury atoms and the mercury atoms radiate light. Life span: 2000 to 3000hrs under rated power
2. What is the total **amount of mercury** put on the market in the EU annually and currently in use for each of these different mercury-using lamp types?	Shipping amount to EU: 70 kg / year Using amount in EU: 190 kg/year
3. For which of these lamp types is the use of **mercury avoidable** (e.g. through substitution of the substance itself or through use of other lamp technologies not containing mercury)? Where has a reduction of the amount of mercury or a full substitution already begun or been completed? Please describe alternatives in (technical) detail.	No substitutes for mercury high-intensity discharge (HID) lamps for projectors available. Solid-state lighting is now under investigation, but there is no prospect for substitutes.
4. Please specify the **maximum amount of mercury** contained in each lamp type today and how it will decrease over time due to technological progress. Support your statement with appropriate documentation such as a roadmap or results of tests and research activities. What is the currently best available technology with regard to lowest mercury content in each lamp type?	Amount of mercury in a lamp: 30mg Solid-state lighting is now under investigation, but there is no prospect for substitutes.
5. Please provide appropriate information on the **benefits of the use of mercury** in lamps, compared to lamps not using mercury; especially with regard to energy savings and hence reduction of mercury emissions during electricity production.	Projection systems require a light source that is both compact and high in brightness. HID arc lamps have many favourable attributes, such as high intensity, brightness, efficiency, reliability and excellent colour rendering properties. Image light projectors, especially those used for projecting a still or moving image onto or through a large screen, typically use high power arc lamps, that operate at 5000 to 7000 watts and higher. Companies have not found yet alternatives with such characteristics yet. Current possible

	alternative, LED lamps, cannot provide such brightness at such a high voltage yet. HID luminance efficiency is higher than LED one (see annex attached), which allows image projectors to rend perfectly the colours and movements of the images, videos to be projected.'
6. Assuming that in the EU a **total phase-out of mercury** is possible for the use in lamps, please specify until when such a phase-out would be completed for which application.	In case of projectors, only enough amount of light can gain be gained with low electric power using mercury HID lamps.
7. Assuming that the existing exemptions do not anymore reflect the status of best available technologies and that an exemption for the use of mercury in lamps in future would only be limited to very specific cases, please provide a **wording proposal** (which may also include an expiry date for the exemption of a certain application).	No substitutes for mercury high-intensity discharge (HID) lamps for projectors available.
8. Please provide an opinion on the recommendations for limits of mercury content included in the preparatory studies for **implementing measures** under the Ecodesign framework Directive (2005/32/EC, "EuP").	No substitutes for mercury high-intensity discharge (HID) lamps for projectors available.

Annex

Comparison of Lamps

	Quantity of Light	Life Span	Cost	Technical Development
HID Lamp with mercury	Much	Middle	OK	Finished
Mercury-free HID Lamp	Little	Middle	OK	Finished
Xenon Lamp	Much	Middle	NG	Finished
LED	Little	Long	NG	Not yet
Laser	Middle	Long	NG	Not yet

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Exemption #3 (Mercury in straight fluorescent lamps for special purposes and #4) or 4 (Mercury in other lamps not specifically mentioned in this Annex)

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31. March 2008

Content

General questionnaire

1. For which substance(s) or compound(s) should the requested exemption be valid?	Hg (Mercury)
2. What is the application in which the substance/compound is used for and what is its specific technical function?	Hg in backlights for LCD displays used in notebooks, LCD computer monitors, and TVs
3. What is the specific (technical) function of the substance/compound in this application?	Mercury is used in fluorescent lamps as part of the light generating process. When power is applied to the lamp electrons move between the electrodes in the lamp. These will collide with the mercury and excite the atoms and move electrons to a higher energy state. When the electrons drop their energy level they emit ultraviolet light. The ultraviolet light strikes the phosphors coating on the lamp and excite their atoms and move electrons to a higher energy state. When their electrons drop their energy level, the lamp emits white light. Mercury is a key substance in creating light in fluorescent lamps. Cold-cathode fluorescent lamps (CCFL) are used as backlights for LCD displays used in notebooks, LCD computer monitors, and TVs.
4. Please justify why this application falls under the scope of the RoHS Directive (e.g. is it a finished product?	Finished products for all three applications are all covered by RoHS.
- Is it a fixed installation?	None of the products using the applications described above are fixed installations.
- What category of the WEEE Directive does it belong to?).	All products using the applications described above are in category 3. IT and telecommunications equipment and category 4. Consumer Electronics of WEEE. The lamps themselves are in category 5. Lamps of WEEE.
5. What is the amount (in absolute number and in percentage by weight) of the substance/compound in:	
i) the homogeneous material[1]	CCFL used as backlights in notebooks: ca. 2.5 mg (maximum range given by lamp manufacturers is 5 mg) CCFL used as backlights in computer monitors: ca. 2.5 mg (maximum range given by lamp manufacturers is 5 mg) CCFL used as backlights in TVs: ca. 3.5 mg (maximum range given by lamp manufacturers is 5 mg)
ii) the application, and	Backlights in notebooks: ca. 2.5 mg Backlights in LCD computer monitors: ca. 10 mg Backlights in TVs: ca. 70 mg
iii) total EU annually for RoHS relevant applications?	Backlights in notebooks: ca. 200 to 300 kg Backlights in LCD computer monitors: ca. 1000 to 1500 kg Backlights in TVs: ca. 2000 to 2500 kg
6. Please check and justify why the	The applications described above all fall in RoHS exemption 3 (Mercury in straight fluorescent

application you request an exemption for does not overlap with already existing exemptions respectively does not overlap with exemption requests covered by previous consultations.	lamps for special purposes) or exemption 4 (Mercury in other lamps not specifically mentioned in this Annex).
7. Please provide an unambiguous wording for the (requested) exemption.	Mercury in straight fluorescent lamps for special purposes (exemption #3) or Mercury in other lamps not specifically mentioned in this Annex (exemption #4)
8. Please justify your contribution according to Article 5 (1) (b) RoHS Directive whereas:	
o Substitution of concerned hazardous substances via materials and components not containing these is technically or scientifically either practicable or impracticable;	Substitution of another material to replace Hg in CCFL's is not technically or scientifically feasible. IT and CE Industry does not expect Hg to be replaced in CCFLs, rather it expects CCFLs will partially be replaced by other technologies, e.g. white or RGB LED (light emission diode) backlight, OLED (organic light emitting diode).
o Elimination or substitution of concerned hazardous substances via design changes is technically or scientifically either practicable or impracticable;	Since 2006 a few big manufacturers have realised some full size LCD computer monitors with LED backlights that are commercially available. NEC's and Samsung's LCD computer monitorscan be bought now, and Acer and LG will also start selling in the near future. Since end 2005 there are also Sony notebook computer series sold with LED backlight units. The LED as a component is produced by very few manufacturers.
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).	
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	Industry is actively developing and commercializing LED technology for notebook, LCD computer monitor and TVs applications. The industry continues to work on improving LED lifetime and color consistency. At present, LEDs meeting CCFL performance requirements are only available in limited quantities due to low yields caused by technology barriers.. The light guide required to achieve the "thin and light" LED panels designs is presently being

possible substitutes, where relevant, etc.).	produced at low yield rates. This limits the overall volumes of LED panels that can be produced and limits market penetration. For larger LCD sizes (TVs) there can be a technical problem caused by a lack of uniformity between the brightness of the different LEDs (LED backlights are assembled per point). Several TV manufacturers have identified a solution to this problem but it comes at a significant price premium. The luminance efficiency of white LED is approximately only half of those of CCFL's. Additionally, currently the ratio of luminance to cost of (white) LED backlights [Lm/cost] is much lower than those of CCFL's. Also the environmental impact of LED manufacturing is bigger than that for CCFL.
10. Please also indicate if feasible substitutes currently exist in an industrial and/or commercial scale for similar use.	There is no substitute for Hg in CCFLs. See above for LEDs (question #8 and #9). LED arrays are currently used in selected notebook and display applications.
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.	There is no substitute for Hg in CCFLs. Regarding LEDs, a few models of notebooks, computer monitors and TVs with LED backlights have been launched on the market but for the moment this remains a niche technology. For a viable LED alternative to Hg containing CCFLs technical barriers and limitations still exist that are currently under active development and therefore accurate future predictions of market penetration cannot be made at this stage.
12. Please indicate if any current restrictions apply to such substitutes. If yes, please quote the exact title of the appropriate legislation/regulation.	
13. Please indicate benefits / advantages and disadvantages of such substitutes.	LEDs do not contain Hg but for the moment remain a niche technology without widespread market penetration due to the reasons outlined in question #9. LEDs may contain arsenic.
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.	Exemption 15 of the ELV Directive exempts mercury in „Discharge lamps and instrument panel displays“.
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.	As indicated in our answers to the specific questions above and below, industry is working towards elimination of Hg containing CCFL over time via the adoption of alternative backlight technologies however a number of barriers to widespread market penetration exist and therefore exemptions #3 and #4 are still required in the foreseeable future. In addition, a transition period for Field Replacement Units (spare parts) would be needed over significant period of time due to the fact that LED technology is not electrically compatible with CCFL technology within the end product.
16. Additional comments	

Specific questionnaire

1. Please specify the different **lamp types that use mercury**, including the technology used, the amount of mercury contained (also mercury per burning hour), the function of mercury in the lamp, the lifetime of the lamp and its energy consumption.	Hg in backlights for LCD displays used in notebooks, LCD computer monitors, and TVs. Mercury is used in fluorescent lamps as part of the light generating process. When power is applied to the lamp electrons move between the electrodes in the lamp. These will collide with the mercury and excite the atoms and move electrons to a higher energy state. When the electrons drop their energy level they emit ultraviolet light. The ultraviolet light strikes the phosphors coating on the lamp and excite their atoms and move electrons to a higher energy state. When their electrons drop their energy level, the lamp emits white light. Mercury is a key substance in creating light in fluorescent lamps. Cold-cathode fluorescent lamps (CCFL) are used as backlights for LCD displays used in notebooks, LCD computer monitors, and TVs. CCFL used as backlights in notebooks: ca. 2.5 mg (maximum range given by lamp manufacturers is 5 mg) CCFL used as backlights in LCD displays: ca. 2.5 mg (maximum range given by lamp manufacturers is 5 mg) CCFL used as backlights in TVs: ca. 3.5 mg (maximum range given by lamp manufacturers is 5 mg) Backlights in notebooks: ca. 2.5 mg Backlights in LCD displays: ca. 10 mg Backlights in TVs: ca. 70 mg
2. What is the total **amount of mercury** put on the market in the EU annually and currently in use for each of these different mercury-using lamp types?	Backlights in notebooks: ca. 200 to 300 kg Backlights in LCD displays: ca. 1000 to 1500 kg Backlights in TVs: ca. 2000 to 2500 kg
3. For which of these lamp types is the use of **mercury avoidable** (e.g. through substitution of the substance itself or through use of other lamp technologies not containing mercury)? Where has a reduction of the amount of mercury or a full substitution already begun or been completed? Please describe alternatives in (technical) detail.	Substitution of another material to replace Hg in CCFL's is not technically or scientifically feasible. IT and CE Industry does not expect Hg to be replaced in CCFLs, rather it expects CCFLs will partially be replaced by other technologies, e.g. white or RGB LED (light emission diode) backlight, OLED (organic light emitting diode). Since 2006 a few big manufacturers have realised some full size LCD computer monitors with LED backlights that are commercially available. NEC's and Samsung's LCD computer monitorscan be bought now, and Acer and LG will also start selling in the near future. Since end 2005 there are also Sony notebook computer series sold with LED backlight units. The LED as a component is produced by very few manufacturers. LED arrays do not contain Hg. When LEDs are developed to the point of providing the quantity and

	quality of light needed they will likely use a comparable or lesser amount of power relative to CCFL's..
4. Please specify the **maximum amount of mercury** contained in each lamp type today and how it will decrease over time due to technological progress. Support your statement with appropriate documentation such as a roadmap or results of tests and research activities. What is the currently best available technology with regard to lowest mercury content in each lamp type?	CCFL used as backlights in notebooks: ca. 2.5 mg (maximum range given by lamp manufacturers is 5 mg) CCFL used as backlights in LCD displays: ca. 2.5 mg (maximum range given by lamp manufacturers is 5 mg) CCFL used as backlights in TVs: ca. 3.5 mg (maximum range given by lamp manufacturers is 5 mg) Please refer to the input of lamp manufacturers to the consultation for the reduction of Hg in CCFL lamps. When replacing CCFL with LED the amount of Hg per lamp will go to zero.
5. Please provide appropriate information on the **benefits of the use of mercury** in lamps, compared to lamps not using mercury; especially with regard to energy savings and hence reduction of mercury emissions during electricity production.	
6. Assuming that in the EU a **total phase-out of mercury** is possible for the use in lamps, please specify until when such a phase-out would be completed for which application.	Regarding LEDs, a few models of notebooks, computer monitors and TVs with LED backlights have been launched on the market but for the moment this remains a niche technology. Technical barriers and limitations still exist that are currently under active development and therefore accurate future predictions of market penetration cannot be made at this stage.
7. Assuming that the existing exemptions do not anymore reflect the status of best available technologies and that an exemption for the use of mercury in lamps in future would only be limited to very specific cases, please provide a **wording proposal** (which may also include an expiry date for the exemption of a certain application).	
8. Please provide an opinion on the recommendations for limits of mercury content included in the preparatory studies for **implementing measures** under the Ecodesign framework Directive (2005/32/EC, "EuP").	Not applicable to exemptions #3 and #4.