RoHS Exemptions 1-4

Evaluation of the input during and after the stakeholde meeting in Brussels

(June 2008)

State of affairs 21.07.2008

Sythesis of meeting:

The main subject of the Brussels meeting was to find a new, more specific classification for "mercury containing lamps" which will not leave any unclarities concerning possible overlapping within the exemptions 1-4. It was discussed that exemption 3 could be specified for certain applications and re-worded. Stakeholders agreed that exemption 4 should be redefined more specifically or might even be deleted as a result of the general re-wordings of exemption 1-3: as an interim result of discussion it could cover HID lamps and CCFL if other exemptions were re-worded.

Furthermore feasible thresholds of the mercury content in different lamp types have been discussed.

We would like to reiterate the open issues and the need for clarification as discussed:

General:

Exemption 3

- For which lamp applications is the LED technology already in use today and for which applications will it be in use within the next 5-10 years? What are possible negative environmental, health and safety impacts of LEDs compared to mercury-containing lamps (please quantify)? Quantify the higher energy efficiency and the longer lifetime of LEDs compared to incandescent and fluorescent lamps.

[JBCE Answer]

This question is exactly same as "1.4 Exemption 3" in previous question just before stakeholder meeting in June. Our perspective is not changed as below.

(1) The light emission efficiency of LED is approximately 60% of CCFL. To achieve same level of picture quality of LCD, LED backlight needs higher power consumption than CCFL backlight.

Power consumption during the LED(RGB) backlight production process is also much higher than during the CCFL production process as mentioned in previous comments to last public consultation (refer to following (2)).

Also to achieve high picture quality, complicated control for each LED is required. A large current is run through the elements whose light intensity reduces (or

deteriorates) more quickly. This causes the phenomenon whereby the color element of a certain point deteriorates quicker than other. Because of this, it is predicted that the life of LEDs used for this purpose will become much shorter than that of those used for illumination purposes.

We can say that compared to CCFL for LCD backlight, LED(RGB) for LCD backlight is higher power consumption in use and production process and shorter life time therefore higher environmental burden.

Comparison of power consumption and life between LCD of CCFL backlight and LED backlight : (for 46 inch type TV)

		Power consumption (LCD)	Life (CCFL / LED)
CCFL	:	155W (450cd/m2)	60,000h
LED(RGB)	:	250W (450cd/m2)	20,000h

(2) Please refer to previous comments in last public consultation for more comments (mentioned in below)

It is impracticable by changing the design to substitute other materials for mercury in the LCD backlight. However, substitution by a completely new design, such as adopting an LED (light emission diode) backlight unit, is practicable. Currently white or RGB LED backlights and OLED (organic light emitting diode) are cited as nominees for substitution material and some models have already been released onto the market. However, it will be some time before they are widely disseminated due to technological problems.

At this point in time, it is difficult to determine the time when the technological improvement will be accomplished to the level at which they can be disseminated.

Therefore, the time of transition to LED should be reviewed in 2012, when next exemption review takes place, considering the technological level and the available supply of LEDs. (For technological problems, see ANNEX II）

CO_2 emissions during the LED backlight production process are considerable higher than CO2 emissions during the CCFL production process (see ANNEX III).

Producing LED backlights for large LCD panels (52 inches in size), for example, results in approximately forty times more CO_2 emissions than is the case with producing CCFL backlights for such LCD panels. Moreover, LEDs are estimated to have a shorter lifespan than CCFLs (ANNEX II)

Although companies are in the process of making LEDs practicable, even now, there remain technological problems as mentioned below:

Technological problems related to LEDs (ANNEX II):

- Amount of CO_2 emission in the production process is approximately 40 times that of CCFL (52 inch size)
- Shorter life
- The light emission efficiency of LED is approximately 60% of CCFL (in the case of TV applications: the efficiency varies depending on the location used)
- Quality is significantly temperature-dependent.

ANNEX II

Technological problems with regard to LED backlight

White LED type	RGB type
● Light emission efficiency is low. (Approx. 60%) ● Efficiency, luminance and chromaticity vary significantly, depending on the temperature fluctuation.	● Light emission efficiency is low. (Approx. 60%) ● Efficiency, luminance and chromaticity vary significantly, depending on the temperature fluctuation.
	● Requires a complicated control for each light emitting element in order to achieve high picture quality. ● Requires a function to control the internal color and luminance distribution, shortening the life of the LED. ➢ A larger current is run through the elements whose light intensity reduces (or deteriorates) more quickly in order to balance the light emission amounts of R, G and B respectively. This causes the phenomenon whereby the color element of a certain point deteriorates quicker than another. ➢ Because of this, it is predicted that the life of LEDs used for this purpose will become much shorter than that of those used for illumination purposes, and color deterioration with age cannot be compensated for.

ANNEX III

1)Comparison of CO_2 emissions in the production process between CCFL and LED: (for a 52 inch type TV)

	Q'ty required	Corresponding power consumption (kwh)	Amount of CO_2 emissions (kg-CO_2)

CCFL	24 pcs	13.4	5.5
LED (RGB)	4,500 pcs	552.0	226.3

※ Reference: Annual power consumption in use (52-inch TV): Approx. 240kwh

※ CO_2 corresponding value: 0.41kg-CO_2/kwh (The Federation of Electric Power Companies in Japan)

2)Comparison of CO_2 emissions in the production process between CCFL and LED: (for a 20.1 inch type Computer Monitor)

	Q'ty required	Corresponding power consumption (kwh)	Amount of CO_2 emissions (kg-CO_2)
CCFL	6 pcs	3.3	1.3
LED (RGB)	756 pcs	92.7	38.0

※Reference: Annual power consumption in use (20.1 inch TV): Approx. 135kwh

Exemption 4

- Would you agree that exemption 4 can be deleted if new exemptions are given for HID lamps and CCFL?

[JBCE Answer]

We can NOT agree since special lamps are not covered if new exemptions are given ONLY for HID and CCFL. Then, we would like to propose the alternative wording that could cover specific lamps instead of No.4 as attached follow-up document.

- Currently covers all other mercury containing lamps not specifically mentioned in exemptions 1-3: please give other examples (than the two above) of lamp types currently covered by this exemption. What is their mercury content? Could they be covered by exemption 1-3 if the wording was changed?

Please kindly find the answers to the above questions in our follow-up document, also (Contens are not changed compared with last draft we sent on 18 July)

ELC (additional information has been provided on 18/6/08):

- Data about variances in Hg contents (qualitative description available in contribution 18/6/08)
- In which case is halophosphate substitution impossible?
- Data about increasing lumen

18/6/08 contribution:

- List of FL for special purposes: which ones are linear, compact FL and non-linear? Is it a complete list or only examples?
- Examples of RoHS applications for electronic control gears, starters, LED modules?
- Why does a 2mg limit for exemption 1 “limit the possibilities in the development of new energy efficient lamp types”? Please explain in more detail.
- Are lamps used in exit signs linear FL?
- Could HID lamps not be covered by an own (new) exemption then allowing exemption 4 to be dropped?

JBCE (additional information has been provided on category 8&9 application):

- Data and references about desktop displays and notebook displays (differences with regard to possible substitution with LED).

[JBCE Answer]

High-resonation and high-quality on LCD is required. The highest level is for TV and 2nd is for desktop display and 3rd is for note-PC. It means the level of technical difficulty is same order. From this required quality’s and technical difficulty’s point of view, we can expect that LED backlight expand to market from lower level to upper (note-PC -> desktop display -> TV). However timeline that LED backlight become common widely should be depending on technology evolution, market demand and supply availability of LED. Therefore it is difficult to predict sunset of CCFL backlight at this moment. It should be after 2014 at earliest and It is necessary to discuss in next review.

- Application data for special purposes (e.g. on scanners)

[JBCE Answer]

We have no other application for “Exemption No3.Mercury in straight fluorescent lamps for special purposes”. We have submited our opinoion only about LCD backlight.

- What is the source of the calculation on CO2 emissions for CCFL and LED production?

[JBCE Answer]

The data is average of collected data from some of manufacturer of CCFL and LED.

Environmental NGO (exemption nos. 1 - 4):

- Which company really specifies mercury content per lamp type on website?
- For exemption 2, halophosphate 10 mg, the proposal is to phase them out but at the same time limitation to 8 mg is proposed for those meeting EuP lumen criteria: why this contradictory proposal?
- Exemption 2, triphosphate with normal lifetime 5 mg, the proposal is 2 mg for lamps below 6 foot: on what is this proposal based?
- Exemption 2, triphosphate with long lifetime 8 mg, the proposal is to eliminate exemption but to set limit to 8 mg for lamps equal and above 6 foot: why this contradictory proposal and on what is this proposal based? What does “insert minimum related life requirement mean”?
- Exemption 4: why should mercury caps on u-shaped and circular fluorescent lamps of 5 mg be included? Would not a change of the wording of exemption 2 cover that?
- What is meant with “appliance lamps” (cf. page 12)? Please give examples of RoHS relevant applications.
- Data about lifetime and energy consumption.

T&M (exemption no. 1):

- Would not LCD manufacturers be required to comply with RoHS and not cat 9 equipment manufacturers?
- How exactly does the electromagnetic compatibility performance affect the continuation or amendment of exemption 1?

EICTA, AeA, JBCE (exemption nos. 3&4) – additional information has been provided by HP on exemption 3:

- You name three specific applications of Hg in lamps: does this mean that IT and CE industry only requires exemptions for these three applications? Are these three applications technologically different from other lamp applications using Hg covered by exemption 1 and 2?
- For Hg used in HID lamps for projectors you state that possible substitutes are Xenon lamps, LED and laser but that they have their own weak points. The table given in the Annex is only quantitative. Could you give more technical details?
- Is the lamp technology used in displays different to that in other lamp applications? Would it make sense to separate exemption wording for CCFL in display backlights and other lamp applications since there are already Hg free alternatives for displays on the market? What would be a feasible phase-out timeline for Hg containing display backlights? Which manufacturers currently use LED backlights? In which applications exactly?

COCIR, Eucomed, EDMA (exemption no. 3):

- You state that no alternatives are available for LCD backlights in patient monitoring and touch screens. Is this technology different from other LCD backlight technologies where LED is available as a substitute?