

Response To Öko-Institut

regarding the

1st Questionnaire Exemption No. 4(b)(I-III)

Exemption for “Mercury in High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index $R_a > 60$:

- I) $P \leq 155\text{ W}$: 30 mg per burner*
- II) $155\text{ W} < P \leq 405\text{ W}$: 40 mg per burner*
- III) $P > 405\text{ W}$: 40 mg per burner”*

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Name and contact details

Company: [LightingEurope](#)

Tel.: +32 2 706 8607



LIGHTINGEUROPE
THE VOICE OF THE LIGHTING INDUSTRY

Name: [Morotz Attila](#)

E-Mail: attila.morotz@lightingeurope.org

Function: [Policy Director](#)

Address: [Diamant Building](#)

[Boulevard Auguste Reyers 80](#)

[1030 Brussels, Belgium](#)

Abbreviations and Definitions

CRI	Colour rendering index
Hg	Mercury
HPS	High Pressure Sodium (vapour) lamps
LEU	LightingEurope

Background

The Oeko-Institut and Fraunhofer IZM have been appointed within a framework contract¹ for the evaluation of applications for the renewal of exemptions currently listed in Annexes III of the new RoHS Directive 2011/65/EU (RoHS 2) by the European Commission.¹

LightingEurope has submitted a request for the renewal of the above mentioned exemption, which has been subject to a first evaluation. The information you have referred has been reviewed and as a result we have identified that there is some information missing and have formulated a few questions to clarify some aspects concerning your request.

Questions

1. It is explained that “*The total amount of mercury brought on the European market by lamps of exemption 4(b) is calculated and the result is sent separately for reasons of confidentiality.*” Such information has not been made available to the consultants as of yet. Please provide such information and where confidential, please provide a range estimation of the amount of Hg to be placed on the EU market through this application as indicative information, which can be made public (for example – the estimated amounts are in the range of 1-10 tonne).

Answer of LightingEurope: The rough estimation of the total amount of mercury put on the market is between 5-10 kg. However detailed calculations cannot be provided in a public document due to confidentiality reasons.

2. It is stated “*High Pressure Sodium lamps with increased colour rendering are characterized by long life (15,000 to 24,000 hours)*”. The term long life is often used in the context of lamps, to describe the ability of a lamp to perform suitably along a minimum service life. Please provide clarification as to this term and why the above mentioned service life (later explained to result in 2-3 years on average) is understood to correlate to the term long life.

Answer of LightingEurope: The term “long life” refers not to another HPS product but to the alternative lamp that will give the same functionality to the end user. For SDW lamps (lamps with a very high red rendering a warm colour, and a lifetime of 15000 hours), the only existing alternatives are halogen or normal incandescent lamps with lifetimes below 4000 hours. The HPS with colour rendering of approximately 60 gives a warm white light and has a lifetime of 24000 hours there is no product yet that gives the same light from a compact luminaire. The CFL-ni lamps come closest but has a higher colour temperature (and better CRI). Their lifetime is shorter than the 24000 hrs of HPS CRI=60.

3. Various applications of HPS lamps addressed by Ex. 4(b)(I-III) are detailed. It is also explained that “*These lamps are handled by technically skilled installers and sold by specialized distributors or as part of lighting equipment. The customers are for example governments, installers, specialized wholesalers, designers of lighting equipment etc.*”
 - a. Please clarify if private consumer applications could be excluded from the exemption at hand or explain why not.

¹ Contract is implemented through Framework Contract No. ENV.C.2/FRA/2011/0020 led by Eunomia

- b. If private consumer applications exist, please provide a characterisation to allow understanding if the amount of Hg required for such uses can be limited for this application range.

Answer of LightingEurope: The HPS lamps are designed and aimed at professional applications only. Based on the estimations provided in the VITO & VHK study (Task 2 ²), Table 3 & Table 4, those lamps are not used in residential applications. However market surveillance and full control over the whole chain is not possible. Hence it is possible that a consumer will choose for HPS lamps and will install them in a non-professional application.

4. Two types of lamps are referred to on page 6, among others referring to the differences in CRI, colour temperature, luminous efficacies, etc.
 - a. Please clarify how these two types and the amounts of Hg used refer to the three entries of the current exemption;

Answer of LightingEurope: In the request following types were included:

- Lamps with a colour rendering above 60³
- Lamps with colour rendering (SDW) > 80⁴

Referring to the examples provided in the respective footnotes:

- In category I for lamps with a power below 155W both families are still available
- In category II: lamps with a power 155W<P<405W only one family is available (lamps with colour rendering > 60).
- In category III (lamps with a lamp power >405W) no lamps are available anymore.

The respective Hg content of mentioned in the exemptions specific products are listed in the referred brochures.

- b. Please clarify if the differences between entries II and III of the current exemption and explain if and how they could be merged into a single entry;

Answer of LightingEurope: The category III might be eliminated completely since the industry does not produce lamps anymore in the category.

5. It is stated that “LED replacement lamps for HPS are proposed by a large variety of suppliers. However, specific replacements for colour improved HPS that mimic its unique colour properties are not yet available”. The importance of the colour rendering properties of the lamps falling under Ex. 4(b)(I-III) is also detailed in other parts of the application (e.g. “removal of mercury from a coloured improved HPS lamp completely eliminates its colour characteristics that are crucial for the application it is used in”). Please clarify how the colour rendering aspect can be integrated into the wording of the different entries of the exemption

2 Preparatory Study on Light Sources for Ecodesign and/or Energy Labelling Requirements ('Lot 8/9/19'), Draft Interim Report, Task 2, Markets, Prepared by VHK, in cooperation with VITO and JeffCott Associates
Date: 19 November 2014, page 2-15, 2-16

3 Please find examples of such lamps and their mercury content via the link below:

http://download.p4c.philips.com/l4bt/3/322865/son-t_comfort_322865_ffs_deu.pdf

4 Please find examples of such lamps and their mercury content via the links below:

(1) http://download.p4c.philips.com/l4bt/3/323010/master_sdw-tg_mini_323010_ffs_nld.pdf

(2) http://download.p4c.philips.com/l4bt/3/322803/master_sdw-t_322803_ffs_nld.pdf

in light of its applicability to the differing application range (for example, restriction of exemption relevant CRI range).

Answer of LightingEurope:

In view of answer to question 4, the boundaries on the mercury content in the exemption can be differentiated based on $60 < \text{CRI} < 80$ or $\text{CRI} > 80$. The lamps with $\text{CRI} > 80$ are made with another technology and use less mercury.

6. On the basis of information provided in response to questions 3, 4 and 5:
- a. Please propose a modified exemption wording which limits the use of the exemption entries to the relevant range of applications.

Answer of LightingEurope: The exemption could be split according to CRI of the lamp.

- b. In your response, please refer to the Hg allowances provided in the three entries and explain if the allowances could be changed in respect of the various lamp properties, as it is understood that the range of Hg applied per lamp is very wide (e.g. “*For high pressure sodium lamps in the scope of the Exemptions 4(b) the maximum dosed mercury amounts vary between 3 and 40 mg*”)

Answer of LightingEurope: See the answer to question 5.

7. On pg. 21 you mention the following study: “The European Commission has drafted a European Lighting Strategy which predicts the evolution of the lighting market in the next 15 years...” Please provide a reference to study report/s and/or to the relevant EU COM policy officer.

Answer of LightingEurope: The graph is published as part of the studies in the one lighting regulation the report can be found on page 2-13 the reference⁵.

8. It is explained that “The bulk of R&D efforts from lighting companies are directed towards acceleration of the Solid State Lighting (SSL) revolution and R&D aimed at decreases in mercury dose of mercury containing lamps have virtually stopped”. In parallel the application claims that current developments of SSL (e.g., LEDs) have not yet provided a candidate that could be considered for substitution of the lamps falling under the scope of Ex. 4(b)(I-III), hence requesting the exemption be granted the maximum validity duration. Please provide a roadmap towards substitution/phase-out of the lamps falling under Ex. 4(b)(I-III) to clarify the expected changes in the trends of use that which justify the discontinued search into alternatives for such lamps.

Answer of LightingEurope: Several attempts have been done to come with LED lamps with a similar colour impression like the SDW lamps. The main roadblock is the emission of saturated red light. One way to produce this light is with quantum dots. The application for the best quantum dots (that use cadmium) is not granted yet and generates not enough red light⁶. This means that no breakthrough is ready at present. Research is ongoing for other

⁵ VHK-Vito, Preparatory Study on Light Sources for Ecodesign and/or Energy Labelling Requirements (‘Lot 8/9/19’). Draft Interim Report, Task 2, Figure 1, page 2-13

⁶ “Cadmium in color converting II-VI LEDs (< 10 µg Cd per mm² of light-emitting area) for use in solid state illumination or display systems” (Request for renewal of Exemption 39 of Annex III of Directive 2011/65/EU) <http://rohs.exemptions.oeko.info/index.php?id=182>

options like phosphors, quantum dots or direct red light emission from the LED. The red light on itself is highly appreciated in all lighting applications. It is difficult to generate efficiently, so the granting of the exemption 4b will not limit the efforts to find a good solution for good red light emission since the solution will provide a competitive advantage.

Please note that answers to these questions are to be published as part of the available information relevant for the stakeholder consultation to be carried out as part of the evaluation of this request. If your answers contain confidential information, please provide a version that can be made public along with a confidential version, in which proprietary information is clearly marked.