Consultation Questionnaire Exemption No. 4(b)(I-III) (renewal request)

Exemption for „Mercury in High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index Ra > 60:
I) P ≤ 155 W: 30 mg per burner
II) 155 W < P ≤ 405 W: 40 mg per burner
III) P > 405 W: 40 mg per burner "

Abbreviations and Definitions

CRI	Colour rendering index
LED	Light Emitting Diode
LEU	Lighting Europe
Hg	Mercury
HPS	High Pressure Sodium
HID	High Intensity Discharge
PCA	Poly-crystalline alumina

Background

The Oeko-Institut and Fraunhofer IZM have been appointed within a framework contract[1] 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 (LEU) has submitted a request for the renewal of the above mentioned exemption, which has been subject to a first completeness and plausibility check. The applicant has been requested to answer additional questions and to provide additional information, which shall be made available on the request webpage of the stakeholder consultation (http://rohs.exemptions.oeko.info/index.php?id=228).

LEU explains that the "*exemption covers High Pressure Sodium (HPS) lamps with increased colour rendering index that are member of High Intensity Discharge Lamps (HID) group. The HPS family contains lamps designed for different purposes in the professional market. 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.*

High Pressure Sodium lamps with increased colour rendering are characterized by long life (15,000 to 24,000 hours), good luminous efficiency (from 40 to 92 lm/W) and good to very good colour rendering (CRI of 60 for the first type and 80+ for the second type). The High Pressure Sodium lamps with CRI

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

60 mostly are single-capped with Edison screw caps (E27 and E40 for Europe). The European types of CRI 80 are marketed with G12 and PG-12 bi-pin caps.

The product characteristics make HPS lamps with increased colour rendering the perfect choice for applications that require very good colour rendering with emphasis on warm colours. Typical applications for the CRI 60 types are outdoor applications where colour rendering matters, like city centres and parking's where they provide a typical city atmosphere. The CRI 80+ types are mostly used indoors in shops where objects like red meat, breads or furniture have to be displayed. For these kind of applications these lamps are the only energy efficient option since no other light sources but incandescent are capable of delivering the kind of red saturation that is required. The lamps have to be replaced about every 2 to 3 years.

The main role of mercury is to tune the resistance of the plasma in such a way that the efficiency of the combination lamp and driver functions in an optimal way.

High Intensity Discharge lamps generate light in a compact plasma arc with a high brightness. After the lamp is started by a voltage pulse the initial noble gas discharge heats the lamp and evaporates part of the sodium/mercury amalgam pill. At first it is mainly the mercury that goes into the vapour phase. The increasing mercury vapour pressure increases the electrical resistance in the discharge which allows for putting more power into the discharge. As a consequence of more power coupled into the discharge, the discharge tube wall will heat up and sodium and mercury evaporate further until a state of equilibrium is established between the electrical power supplied to the discharge, the heat conducted to the surroundings and the radiation emitted from the discharge. The lamps are designed such that the optimal efficiency is reached at this equilibrium. The mercury is not consumed over life. However, the sodium in the discharge tube does chemically react with the PCA wall and the electrode emitter14 15. As a consequence the fraction of mercury in the amalgam becomes higher and this raises the lamp voltage. At a certain point in time the lamp voltage becomes so high that the mains voltage can no longer sustain the arc and the lamp extinguishes."

LEU claims 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. There are no replacement lamps for the colour improved High Pressure Sodium family available, not at system level and not at LED luminaires level. Therefore the renewal of the exemption is requested.

For details, please check the applicant's exemption request at:
http://rohs.exemptions.oeko.info/index.php?id=236

The objective of this consultation and the review process is to collect and to evaluate information and evidence according to the criteria listed in Art. 5 (1) (a) of Directive 2011/65/EU (RoHS II), which can be found under:

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32011L0065:EN:NOT

If you would like to contribute to the stakeholder consultation, please answer the following questions:

Questions

1. LightingEurope has requested the renewal of Exemption No. 4(b)(I-III) of Annex III, with the same wording formulation
    a. Do you agree with the scope of the exemption as proposed by the applicant?

b. If not, please suggest an alternative wording and explain your proposal.
c. Please explain why you either support the applicant's request or object to it. To support your views, please provide detailed technical argumentation / evidence in line with the criteria in Art. 5(1)(a) to support your statement.
d. Please clarify the differences between entries II (155 W < P ≤ 405 W: 40 mg per burner and III (P > 405 W: 40 mg per burner) of the current exemption and explain if and how they could be merged into a single entry;

2. LEU states "*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. It can be understood that lamps are mainly used for other than private consumer applications. Please state if you agree with this observation;
    b. In this respect, please explain if private consumer applications could be excluded from the scope of Ex. 4(b)(I-III) and if relevant propose a suitable formulation to reflect such an exclusion.

3. LEU states 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*".

    a. Do you agree with this statement? Please explain why.

    b. What are the requirements of typical applications (outdoor applications where colour rendering matters, like city centres and parking; and internal applications like shops where objects like red meat, breads or furniture have to be displayed) in terms of spectral distribution and to what extent can LED-lamps or other alternatives match these requirements?

    c. Assuming that the colour rendering aspect is of relevance to all applications for which this exemption is still needed, please explain if it can be reflected differently in the wording of each of the entries of the exemption;

    d. Please support your views with data and relevant information to clarify the availability of LED substitutes for lamps falling under Exemption 4(b)(I-III);

4. It can be understood from LEU's application that "*For high pressure sodium lamps in the scope of the Exemptions 4(b) the maximum dosed mercury amounts vary between 3 and 40 mg*".

    a. Can Hg allowances provided in each of the three entries be adjusted in light of possible reductions that have taken place in actual amounts of dosed Hg per lamp, for each of the entries? Please propose how.

    b. If this is not yet possible, please explain why, supporting your views with sufficient data and information;

5. Please provide information concerning possible substitutes or developments that may enable reduction, substitution or elimination, at present or in the future, of lamps falling under Ex. 4(b)(I-III);

    a. In this regard, please provide information as to alternatives that may cover part or all of the applicability range of lamps falling under Ex. 4(b)(I-III);

   b. Please provide quantitative data as to application specifications to support your views.

6. Please provide information as to research initiatives which are currently looking into the development of possible alternatives for some or all of the application range of lamps falling under Ex. 4(b)(I-III).

   a. Please explain what part of the application range is of relevance for such initiatives (in what applications substitution may be possible in the future).

   b. Please provide a roadmap of such on-going research (phases that are to be carried out), detailing the current status as well as the estimated time needed for further stages.

7. Are there any other aspects you deem to be of importance for the requested exemption?

In case parts of your contribution are confidential, please clearly mark relevant text excerpts or provide your contribution in two versions (public /confidential).

Finally, please do not forget to provide your contact details (Name, Organisation, e-mail and phone number) so that Oeko-Institut/Fraunhofer IZM can contact you in case there are questions concerning your contribution. Please also note, however, that requested exemptions cannot be granted based on confidential information!