

Consultation Questionnaire Exemption No. 2(a)(1-5) (renewal request)

Exemption for „ Mercury in double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp):

“(1) Tri-band phosphor with normal lifetime and a tube diameter < 9 mm (e.g. T2): 5 mg”: 4 mg may be used after 31 December 2011

“(2) Tri-band phosphor with normal lifetime and a tube diameter \geq 9 mm and \leq 17 mm (e.g. T5): 5 mg”: 3 mg may be used after 31 December 2011

“(3) Tri-band phosphor with normal lifetime and a tube diameter > 17 mm and \leq 28 mm (e.g. T8): 5 mg”: 3,5 mg may be used after 31 December 2011

“(4) Tri-band phosphor with normal lifetime and a tube diameter > 28 mm (e.g. T12): 5 mg”: 3,5 mg may be used after 31 December 2011 – renewal not requested

“(5) Tri-band phosphor with long lifetime (\geq 25 000 h): 8 mg”: 5 mg may be used after 31 December 2011“

Abbreviations and Definitions

AC	Alternating-current
CG	Control gear
Hg	Mercury
LEU	LightingEurope
NARVA	NARVA Lichtquellen GmbH + Co. KG

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 and NARVA Lichtquellen GmbH + Co. KG have submitted requests for the renewal of the above mentioned exemption entries, which have been subject to a first completeness and plausibility check. The applicants were requested to answer additional questions and to provide additional information that shall be made available on the request webpage of the stakeholder consultation (<http://rohs.exemptions.oeko.info/index.php?id=228>).

LEU have applied for the renewal of Ex. 2(a), entries 1,2,3 and 5. NARVA have also applied for the renewal of these entries as well as for the renewal of Ex. 2(a)(4). Both applicants request the exemption be extended with the current wording formulation listed in Annex III of the RoHS Directive and for the maximum available duration allowed (based on Art. 5(2) of the Directive).

Fluorescent lamps are explained by LEU to be “low-pressure discharge lamps. Mercury is intentionally applied to fluorescent lamps in homogenous materials exceeding the limit value of 0.1% weight. When

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

electric current flows through the lamp bulb (=discharge tube), the mercury atoms in a gas phase inside it are excited and produce UV radiation. This UV light is then converted into visible light by the fluorescent coating on the internal surface of the glass tube of the lamp bulb. The composition of the coating determines light colour and colour rendering.”

According to LEU the exemption covers Hg in double-capped linear triband phosphor fluorescent lamps for general lighting purposes, with various tube diameters and lengths and with various lifetimes (entries a-d relate to normal life-time lamps, and entry 5 relates to long life as explained below). Linear lamps are explained to be very economical, to offer a good quality of light and to have an excellent luminous flux. The lamps are explained to be used for private consumer uses (residential) as well as for professional and commercial uses (offices, shops, industry, etc.), with the split of market share between such uses varying between the different exemption entries. Double capped fluorescent lamps are always components of a lighting system. Because of the physics of gas discharge, fluorescent lamps cannot be operated directly on AC (alternating-current) line voltage.

Linear fluorescent luminaires are explained by LEU to be operated with a control gear. “There are numerous different control gears available on the market offering various functionality. They are used depending on the customers/users requirements, such as dimming, temperature range, light management systems, emergency lighting, single or multi lamp drive, stand-alone luminaire vs. multi-luminaire lighting system etc.. Electronic control gears (ECG) are explained to have several advantages compared to conventional control gears (CCG) regarding power consumption, lifetime, maintenance costs, temperature behaviour, switching, flicker, dimming etc..

LEU provide typical parameters for each entry to further describe the range of lamps available on the market and covered by this exemption:

	Ex. 2(a)(1)	Ex. 2(a)(2)	Ex. 2(a)(3)	Ex. 2(a)(4)
Available Wattages (main types used in EU)	6 Watt, 8 Watt, 11 Watt, 13 Watt	4 - 80 W	10 - 70 W	10 - 70 Watt (W)
Available Colour Temperatures	2.700K up to > 6.500 Kelvin (K)	2.700K up to > 6.500K	2.700K up to > 6.500K	2.700 up to >6.500 K
Typical Colour Rendering Index (Ra)	70-79	80 - >90	80 - >90	80 - >90
Average Lifetime	8.000hrs (with preheat electronic control gear) ²	Typically ca. 20.000hrs on an electronic control gear ²	Typically 15.000 - 20.000hrs on an electronic control gear ²	Typically 40.000 – 90.000 hrs (B50): Corresponding service life time: 30.000 h (T5 on ECG), up to 75.000 (T8 on ECG)Dimmable;
Base (standard designation)	W4.3 x 8.5d (IEC/EN60061)	G5 (bi-pin), (acc IEC/EN60061):	G13 (bi-pin), IEC/EN60061),	
Additional aspects mentioned:		Dimmable	Dimmable (with special electronic control gear)	Dimmable;

² Explained by LEU as: Average rated lamp life (B50) which is the average value of the life values of individual lamps operated under standardized conditions (50 % failure). In other words, this is the operation time at which for a standardized 3-hour switching cycle (165 minutes on/15 minutes off in accordance with IEC 60081 and IEC 60901) 50 % of a sample population of lamps have failed.

Estimations of the number of lamps placed on the EU-28 market in the last years for each of the exemption entries applied for were also provided by LEU as follows (T5 and T8 lamps, additional data is specified in the application dossiers:

Entry	2009	2012	2013	2014
Ex. 2(a)(1) (T2 lamps) – global data.	400.000 lamps		250.000 – 300.000 lamps	
Ex. 2(a)(2) (T5 lamps) – EU 28 data.	57 Mio. lamps	81 Mio. lamps	76 Mio. lamps	
Ex. 2(a)(3) (T8 lamps Tri-band) – EU 28 data.	175 Mio. lamps	261 Mio. lamps	247 Mio. lamps	
Ex. 2(a)(3) (T8 lamps Halophosphate– EU 28 data.	113 Mio. lamps	4 Mio. lamps	2 Mio. lamps	
Ex. 2(a)(5) (Long-life lamps, T5, T8) – EU 28 data.	Data understood to represent totals for T5 and T8 lamps of various service lives and not just long-life – please complete if specific data is available or can be estimated			<i>8 – 10 Mio. T5 and T8 lamps</i>

From the applications, it can be understood that the potential for reducing the amount of Hg per lamp has been realised and that further reduction of the amount shall be difficult. Substance substitutes for Hg within discharge lamps are also explained to have not been proven practical, and so alternatives are to be in the form of Hg free technologies such as LEDs. LEU explains that LED technologies, currently do not provide a drop-in substitute for the full range of products covered under this exemption. It provides information as to routes for replacing a linear fluorescent lamp related to LED substitutes:

- Retrofit route: a fluorescent lamp is substituted by a LED tube. The luminaire itself is not rebuilt and the control gear remains in the installation. Driver compatibility is assumed here.
- Conversion route: the fluorescent lamp is replaced, and technical changes also need to be made to the luminaire: ballasts and/or internal wiring may need to be replaced or altered – it is explained that this shifts the responsibility for the technical and the safety consequences of the conversion to the party carrying out the conversion.
- Rewiring route – removing the control gear (CG) from the existing installation – in these cases it is assumed that driver compatibility of the LED requires removal of the CG.
- Replacing the luminaire completely with an LED compatible luminaire (in some cases luminaire with integrated LED).

Against this background, the main argumentation for the justification of the exemptions' renewal is that in many cases, the use of LED (light emitting diode) lamps requires full luminaire replacement. If the exemption is not renewed, this shall force a phase-out of linear fluorescent lamps, according to LEU, requiring in many cases to replace the luminaires and not just the lamp. This would lead to high investment and negative environmental impact, especially where luminaires are installed in furniture, vehicles, installations or other electrical and electronic equipment. LEU claim that based on recent studies³ LED luminaires so far do not reveal a clear general environmental benefit e.g. due to higher

³ Quoted by LEU as: CALiPER, "Application Summary Report 21: Linear (T8) LED Lamps", p.6

energy efficiency during the use phase. Against this background, an exemption for mercury in lamps covered by this exemption is requested with a maximum validity period and with no expiry date.

For details, please check the applicant's exemption request at:

<http://rohs.exemptions.oeko.info/index.php?id=231>

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. Both LEU and NARVA have requested the renewal of Ex. 2(a) entries 1, 2, 3 and 5 of Annex III, with the same wording formulation and for the maximum possible duration. NARVA has also requested a renewal of Ex. 2(a)(4) with the same wording formulation and for a maximum duration:

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- a. Do you agree with one of the proposed formulations? Please detail which one.
 - b. Please suggest an alternative wording and explain your proposal, if you do not agree with the proposed exemption wordings.
 - 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. There have been indications that T12 Tri-band phosphor lamps have been phased-out, or shall phase-out shortly. This is also supported by the fact that LEU did not apply for Ex. 2a(4). Please explain why this exemption is still needed if you do not agree with this expectation.
2. LEU explain “that based on recent studies LED luminaires so far do not reveal a clear general environmental benefit e.g. due to higher energy efficiency during the use phase”.
 - a. Do you agree with this statement? Please clarify for what entries of the exemption you agree and for what entries you do not.

- b. Please explain if this statement is relevant only for LED replacement lamps in existing luminaires designed for Ex. 2(a)(1-5) lamps, or if this statement is also relevant when replacing such luminaires with new LED installations.
 - c. Please substantiate your statements with information and data allowing a comparison of performance of T2 / T5 / T8 linear fluorescent lamps with respective LED replacements in lamp-luminaire combinations.
3. Please describe impacts expected should the requested exemption not be renewed:
 - a. To what degree shall a replacement through LED lamps (retrofit/conversion/rewiring) take place over the coming 10 years? Alternatively, in what market share of the Luminaire Park shall a replacement of luminaires be required over the next 10 years?
 - b. Please provide a comprehensive description of the impacts to arise over the next 10 years, of a non-renewal scenario of the requested exemption, in terms of:
 - i. Total energy consumption;
 - ii. Environmental impacts;
 - iii. Health and safety impacts;

Please specify in each case the assumptions made and the data basis used to arrive at your estimations;
 - c. To what degree could better availability of information for consumers and users enable a decrease in the range of the difficulties described in relation to the retrofit and conversion routes, where changes to the luminaire are concerned?
4. It can be understood that lamps falling under the various exemption entries can be used by both private consumers and commercial consumers (office building, schools, industrial buildings, etc.), however it is anticipated that the share of lamps used for private uses differs between the various entries, and it is expected that private use may not be relevant for lamps of each entry.
 - a. Do you agree with this observation? Please support your answer with data as to market share of Entry 2(a)(1-5) lamps and the distribution of market share between private and commercial uses.
 - b. If relevant, please suggest from what entries private consumer uses could be excluded.
5. LEU have provided typical specifications for lamps falling under Ex. 2(a)(5), which are long-life lamps, from which it is understood that such lamps are only available in T5 and T8 geometries.
 - a. Do you agree with this understanding?
 - b. If you do not agree, please support your views with specifications of products falling under this entry of other than T5 and T8 geometries.
 - c. If you agree, please provide a proposal for the reformulation of this entry so that other lamp geometries are excluded.
 - d. If relevant please also suggest in your proposal a change in the specified threshold above which a lamp is considered to be long-life and/or a change in the maximum allowed amount of Hg that can be applied in the lamp.
6. It can be understood that there is a difference in availability of LED alternatives when intended for use as replacements in existing luminaires designed for Ex. 2(a)(1-5) lamps and when included as part of a new LED luminaire.

- a. Please comment on this statement referring to its relevance in the context of the various exemption entries;
- b. Please clarify if for some or all of the entries, the exemption could be limited for use of linear fluorescent lamps in installations placed on the market before 2016 (or before another date, which you can specify and explain its relevance);

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.