

# Consultation Questionnaire Exemption No. 4(f) of RoHS Annex III

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Current wording of the exemption:

*Mercury in other discharge lamps for special purposes not specifically mentioned in this Annex*

Requested validity period: Maximum (5 years and 7 years (cat. 8 and 9) respectively)

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## ACRONYMS AND DEFINITIONS

UV	Ultra Violet
LED	Light-Emitting-Diode
Hg	Mercury
LEU	LightingEurope

## 1. INTRODUCTION

### 1.1. Background

Bio Innovation Service, UNITAR and Fraunhofer IZM have been appointed<sup>1</sup> by the European Commission through for the evaluation of applications for the review of requests for new exemptions and the renewal of exemptions currently listed in Annexes III and IV of the RoHS Directive 2011/65/EU.

VDMA and Lighting Europe submitted requests<sup>2</sup> for the renewal of the above-mentioned exemption. The request has been subject to a first completeness and plausibility check. The applicant has been requested to answer additional questions and to provide additional information, available on the request webpage of the stakeholder consultation<sup>3</sup>.

The stakeholder consultation is part of the review process for the request at hand. 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.<sup>4</sup>

To contribute to this stakeholder consultation, please answer the below questions until the 27th of May 2021.

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<sup>1</sup> It is implemented through the specific contract 070201/2020/832829/ENV.B.3 under the Framework contract ENV.B.3/FRA/2019/0017

<sup>2</sup> Exemption request available at [RoHS Annex III exemption evaluation - Stakeholder consultation \(biois.eu\)](https://biois.eu/rohs-annex-iii-exemption-evaluation-stakeholder-consultation)

<sup>3</sup> Clarification questionnaire available at [RoHS Annex III exemption evaluation - Stakeholder consultation \(biois.eu\)](https://biois.eu/rohs-annex-iii-exemption-evaluation-stakeholder-consultation)

<sup>4</sup> Directive 2011/65/EU (RoHS) available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32011L0065:EN:NOT>

## 1.2. Summary of the Exemption Request

According to VDMA: *"The application for prolongation of the existing exemption refers to mercury-containing UV discharge lamps which are used for curing (e.g. of layers of inks and coatings, adhesives and sealants), for disinfection (e.g. of water, surfaces and air) and for other industrial applications (surface modification, surface activation) The application includes the following lamp types:*

- **UV medium-pressure discharge lamps (MPL) for curing, disinfection and other industrial applications** (internal operating pressure > 100 mbar). The UV medium-pressure lamps can be doped with iron, gallium or lead in addition to the mercury they contain.
- **UV low-pressure discharge lamps for special purposes in the high power range.** [...]

*Typical applications to be covered by this application include curing, e.g. of inks and coatings, disinfection of water etc., and other industrial applications like surface activation and cleaning.*

*It is technically not possible to replace mercury in special UV lamps with other materials/chemicals in order to achieve the same widespread radiation distribution. LED-based technologies are increasingly being used, which in certain applications (e.g. curing) also offer many advantages over mercury-containing UV lamps. Nevertheless, LED technologies cannot be used as an equivalent replacement in many applications. "*

According to LightingEurope, "[...] The renewal application concerns lamps and UV light sources defined as:

- High Pressure Sodium (vapour) lamps (HPS) for horticulture lighting,
- Medium and high-pressure UV lamps for curing, disinfection of water and surfaces, day simulation for zoo animals, etc...
- Short-arc Hg lamps for projection, studio, stage lighting, microlithography for semiconductor production, etc...

### **Replacement of mercury and mercury containing lamps is impracticable:**

- *The lamps covered by exemption 4(f) must remain available on the EU market:*
  - o *For new equipment for certain applications where no functionally suitable alternatives are available*
  - o *As spare parts for in-use equipment as replacing end-of-life lamps avoids having equipment become electronic waste before due time"*

## 2. QUESTIONS

1. VDMA and LightingEurope<sup>2</sup> requested the renewal of the above exemption for the maximum validity periods with the same scope and wording for all EEE of cat. 3 and 5 (VDMA) and cat. 1-10 (LEU).
  - a. Please let us know whether you support or disagree with the wording, scope and requested duration of the exemption. To support your views, please provide detailed technical argumentation / evidence in line with the criteria<sup>4</sup> in Art. 5(1)(a).

- b. If applicable, please suggest an alternative wording and duration and explain your proposal.

1a) The exemptions should stay as they are since there are no equivalent alternatives available yet for mercury lamps. Exemption should be renewed for at least another 5 years and beyond.

1b) alternatives are not there or need still a lot time to be available on large scale and for all applications. Since not all applications are known, the wording “Mercury in other discharge lamps for special purposes not specifically mentioned in this Annex” should be kept.

2. Please provide information concerning possible substitutes or elimination possibilities at present or in the future so that the requested exemption could be restricted or revoked.

- a. Please explain substitution and elimination possibilities and for which part of the applications in the scope of the requested exemption they are relevant.

2a) a possible replacement in the UV-C range are UV-C LEDs. Development of UV-C has started many years ago. In the last 10 years UV-C have made some progress, but it takes many years more to reach the efficiency, lifetime, power densities and costs of UV lamps

For disinfection application and any applications where high doses of UV-C radiation is used and where lamps with many hundred watts or even kilowatts of UV-C are used, costs of LEDs are more than a factor of 1000 higher compared to UV lamps, while efficiency and lifetime is only 10% of UV lamps.

Since energy efficiency of UV-C LEDs and possible other replacement technologies is always worse than UV-C mercury lamps, environmental disadvantages (high CO<sub>2</sub> emissions, emissions of other pollutants (among others mercury) by burning fossil fuels) would rise.

Possible alternative technologies to treat water are chlorine or ozone treatment, both with similar or higher negative impact on the environment provided that mercury based lamp technologies are 100% recyclable with zero emission to the environment

- b. Please provide information as to research to find alternatives that do not rely on the exemption under review (substitution or elimination), and which may cover part or all of the applications in the scope of the exemption request.

2b) we are working on alternative technologies for mercury for many years (LEDs, excimer lamps, mercury free fillings for plasma lamps) etc.

So far we have not found any alternatives which are comparable and competitive to mercury lamps.

LEDs in the UV-A range can replace some of the mercury lamps but not all, since the LEDs also have disadvantage.

In the UV-B and UV-C range alternative technologies like excimer lamps or fluorescent lamps based on a mercury free discharge lamp can only replace selective applications.

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

2c) Our roadmap contains feasibility studies for alternative technologies for the next years and a possible product development in the mid of the decade. We produce UV lamps with an UV-C output of up to 5kW.

We expect mercury free alternatives for such lamps not before 10 years in advance.

3. Do you know of other manufacturers producing devices of comparable features and performance like the ones in the scope of this exemption request that do not depend on RoHS-restricted substances, or use smaller amounts of these substances compared to the applications in the scope of this exemption?

3) In many applications, especially where large quantities of UV are needed or very low wavelengths in the range of 185-230 nm, we don't know of any alternative systems. For applications like drinking water disinfection (small to midsize) feasibility studies with UV-C LEDs where undertaken but products are far away from being competitive.

Furthermore, for existing systems a simple replacement is not possible. Existing UV systems do usually have an adapted driving technology which cannot be simple replaced.

A replacement would need the whole UV system to be replaced not only the UV source.

4. As part of the evaluation, socio-economic impacts shall also be compiled and evaluated. For this purpose, if you have information on socioeconomic aspects, please provide details in respect of the following:

- a. What are the volumes of EEE in the scope of the requested exemptions which are placed on the market per year?

- b. What are the volumes of additional waste to be generated should the requested exemption not be renewed or not be renewed for the requested duration?

4b) hundred thousand of systems could not be operated any more. All these systems would need to be scrapped. Alternative technologies like chlorination systems need to be built causing a high CO<sub>2</sub> and material footprint.

- c. What are estimated impacts on employment in total, in the EU and outside the EU, should the requested exemption not be renewed or be renewed for less than the re-requested time period? Please detail the main sectors in which possible impacts are expected – manufacturers of equipment in the scope of the exemption, suppliers, re-tail, users of MRI devices, etc.

4c) if the exemptions are not extended and even worse a complete mercury ban in lamps would be considered our whole company would lose its existence. We're currently employing 130 people all working on equipment related to mercury lamps.

A possibility to continue our business would be to relocate the company outside the EU where mercury lamps are still allowed.

- d. Please estimate additional costs associated should the requested exemption not be renewed, and how this is divided between various sectors (e.g. private, public, industry: manufacturers, suppliers, retailers).

4d) Alternative technologies have different prices and advantages/disadvantages. For example, alternatives for high power mercury lamps could be

- chlorine (twice as expensive with additional environmental risks)
- UV-C LEDs: costs for a 5kW lamp would be roughly 1 Mio Euro vs. a few hundred Euros for a mercury lamp

Higher costs would be distributed to all sectors. For example water purification for the public would be much more expensive and less environment friendly. All industries where disinfection is needed (e.g. food and beverage) had to bear higher costs. Private users had to pay more for the end products,...

5. Any additional information which you would like to provide?

Mercury lamps are a economical and very safe technology. Absolutely no mercury will come into the environment as long as the lamps are handled properly. Proper disposal and recycling systems exist all over the world. All other technologies lead to higher mercury emissions (through firing of fossil fuels) or have higher risks for the environment and health (like chlorine, ozone).

**Please note that answers to these questions can be published in the stakeholder consultation, which is 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.**

**Please do not forget to provide your contact details (Name, Organisation, e-mail and phone number) so that the project team can contact you in case there are questions concerning your contribution.**

11.5.2021

**Dr. Markus Roth**

**General Manager**

**eta plus electronic gmbh**