

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

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)

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 appointed¹ 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 requests² for the renewal of the above-mentioned exemption. The request has been subject to a first completeness and plausibility check. The applicant has been re-requested to answer additional questions and to provide additional information, available on the request webpage of the stakeholder consultation³.

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.⁴

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

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),*

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

² Exemption request available at [RoHS Annex III exemption evaluation - Stakeholder consultation \(biois.eu\)](http://biois.eu)

³ Clarification questionnaire available at [RoHS Annex III exemption evaluation - Stakeholder consultation \(biois.eu\)](http://biois.eu)

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

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 LightingEurope² 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 re-requested duration of the exemption. To support your views, please provide detailed technical argumentation / evidence in line with the criteria⁴ in Art. 5(1)(a).

We absolutely support the wording, scope and requested duration of the exemption. Because the best potential alternative for medium pressure mercury lamps the UV LEDs are still by far not comparable in terms of curing power, durability, and the cost performance ratio.

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

The shortening of the duration must be refused from the industry's point of view. The development of competitive UV LEDs is still going on but will for sure need many more years to be actually comparable with mercury UV lamps. The only possibility for reduction of exemption is to promote the switch a partial migration of UV lamps to LED lamps, especially for Gallium doped ones, but no complete replacement can be accomplished.

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.
 - 1) **Electron Beam: this technology allows the polymerization of UV coating without use of UV sources. Polimers are crosslinked through gamma-radiation generated by Electron Beam equipment. This apparatus is very high cost (100 times more than a standar UV lamps) and they require very big space, and have severe safety issues coming from gamma-radiation**
 - 2) **LED lamps: this technology can only partially substitute UV lamps for curing UV coatings. They offer only a limited emission spectra leading to a lower polimerization rate. At the moment only gallium doped lamps can be partially replaced, and UV lamps are in any case required for full polimerization of UV coatings. LED with UV-C that can avoid the use of mercury doped UV lamps, are still in a very preliminary phase development and they can't provide at the moment a real substitution to UV lamps**
 - 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.

Main potential substitution of Mercury doped UV lamps is to use LED lamps. Unfortunately they can't provide the same efficiency in terms of cuirng of UV varnishes. Research must be oriented towards wide spectrum LED lamps, new photoinitators for improved curing and also binders suitable for this type of UV emission.
 - 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.

There is no roadmap at the moment, since no complete substitution of Hg doped UV lamps can be accomplished.
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?
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 ex-emption not be renewed or not be renewed for the requested duration?
 - 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-quested 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.

Most employers of mercury-based UV technology would be confronted with a professional ban, leading to huge amount of unemployment and loss of products and productivity. Many

companies and factories would stop existing. We don't have exact figure and can only state to the best of our knowledge that thousands of companies exist only in the EU that employ UV technology based on mercury lamps. Some of them rely to up to 100% on the availability of mercury lamps (e.g., lamp manufacturers, power supply manufacturers, quartz suppliers, UV measuring device manufacturers, printers and coaters,). It would have the following the impact on our company/ on our customers: The half of our products in the area of furniture would no longer be applicable. In the area of industrial coating of parquet we would have no alternatives. The following business area would be discontinued: Furniture industry, parquet industry The following business area would be transferred to locations outside of the EU/EEA: Furniture industry, parquet industry

- 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).

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

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.

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