

Consultation Questionnaire Exemption No. 37 (renewal request)

Exemption for „Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body“

Abbreviations and Definitions

GE	General Electric
HVD	high voltage diode(s)
Pb	lead

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

GE et al. and Ixys submitted requests for the renewal of the above mentioned exemption, which have been subject to a first completeness and plausibility check. The applicant has been requested to answer additional questions and to provide additional information, to be made available on the request webpage of the stakeholder consultation (<http://rohs.exemptions.oeko.info/index.php?id=228>).

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 read the following summary of the exemption requests and answer the below questions.

Summary of Exemption Requests

The exemption was reviewed once in 2007². At that time, the applicants explained that lead in zinc borat glass is needed to reach a similar extension as the attached metal pins. Alternative glass types are technically not practicable as other materials than glass do not fulfil the specific surface conditions, which are important to avoid flashover at high voltages of 1,800 V. Furthermore, the expansion of all other materials in the HVD is adjusted to this zinc borat glass so that only this kind of glass fulfils all of the technical/physical requirements.

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

² For details see report of (Gensch, Carl-Otto, Stéphanie Zangl, and Otmar Deubzer 2007) "Adaptation to scientific and technical progress under Directive 2002/95/EC: Final report." Accessed August 11, 2015. <http://ec.europa.eu/environment/waste/weee/pdf/rohs.pdf>, page 58 et seqq.

Furthermore, the applicant argued that during the production process, the zinc borat glass body will be dissolved and lead dissolved from the glass gathers in the plating material's pure tin thus resulting in the unwanted but unavoidable contamination of the plating layer. Figure 1 shows examples of HVD diodes in the scope of this exemption request.

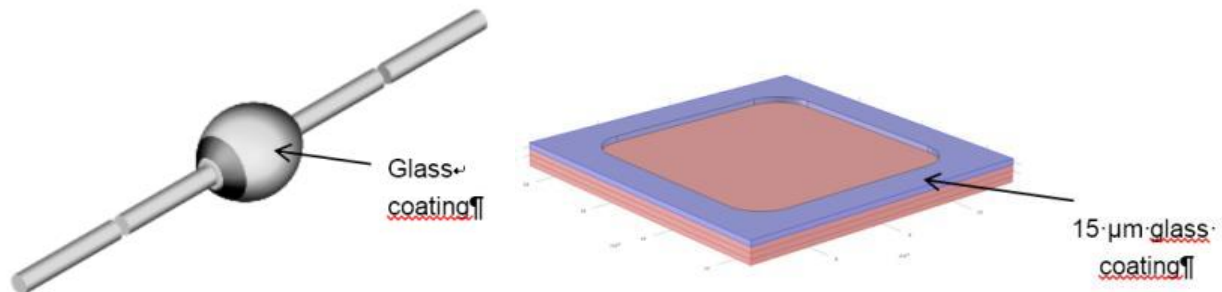


Figure 1: High voltage diode in SOD-57 case, and silicon diode die (~10x10 mm²)³

Source: Ixys (2015)

Both applicants request the renewal of Ex. 37 in its current wording for the maximum validity period of five years. GE et al. argue that alternative technologies have been evaluated but so far no substitution technology is available. During the manufacturing process lead from the glass dissolves into the plating solution during the terminal plating process. The lead content in the plating is an unavoidable contamination resulting from the manufacturing process.

Ixys states, however, that new passivation systems are under development, e. g. diamond-like carbon coatings or amorphous silicon-oxide layers, which are lead-free and thus cannot contaminate the plating bath with lead.

For details, please check the applicants' exemption request at:

<http://rohs.exemptions.oeko.info/index.php?id=257>

Questions

1. How can high voltage diodes be differentiated from other diodes that are not “high voltage” and therefore do not require this exemption?

2. Ixys reports about new passivation systems that are under development, e. g. diamond-like carbon coatings or amorphous silicon-oxide layers.
Please provide information on research and results of lead-free materials or alternative processes related to the above requested exemption that avoid the lead contamination of the HVD plating layers.

³ Source: Ixys

3. Besides substitution, elimination, i.e. the use of alternative technologies, is a principle way to avoid the use of lead, e.g. via a redesign of electronic circuits so that these HVD are no longer required, or any other means. What is the electrical/electronic function of HVD, and are there ways to eliminate their use?

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

In case parts of your contribution are confidential, please provide your contribution in two versions (public /confidential). Please also note, however, that requested exemptions cannot be granted based on confidential information!

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.

References

(Gensch, Carl-Otto, Stéphanie Zangl, and Otmar Deubzer 2007) "Adaptation to scientific and technical progress under Directive 2002/95/EC: Final report." Accessed August 11, 2015. <http://ec.europa.eu/environment/waste/weee/pdf/rohs.pdf>.