

Exemption Renewal Request Form

Date of submission: 22.12.14

1. Name and contact details

1) Name and contact details of applicant:

Company: IXYS Semiconductor GmbH Tel.: 49 6206 503300
Name: Markus Bickel E-Mail: m.bickel@ixys.de
Function: Quality Officer Address: Edisonstr. 15, D-68623
Lampertheim

2) Name and contact details of responsible person for this application (if different from above):

Company: _____ Tel.: 49 6202 572923
Name: Dr. Arno Neidig E-Mail: contepla@t-online.de
Function: Consultant Address: Bruehler Weg 42,
D-68723 Plankstadt

2. Reason for application:

Please indicate where relevant:

- Request for new exemption in:
 Request for amendment of existing exemption in
 Request for extension of existing exemption 37 in annex III
 Request for deletion of existing exemption in:
 Provision of information referring to an existing specific exemption in:
 Annex III Annex IV

No. of exemption in Annex III or IV where applicable: **7a**

Proposed or existing wording: **lead in coatings of high voltage diodes**

Duration where applicable: **no expiry date**

Other: _____

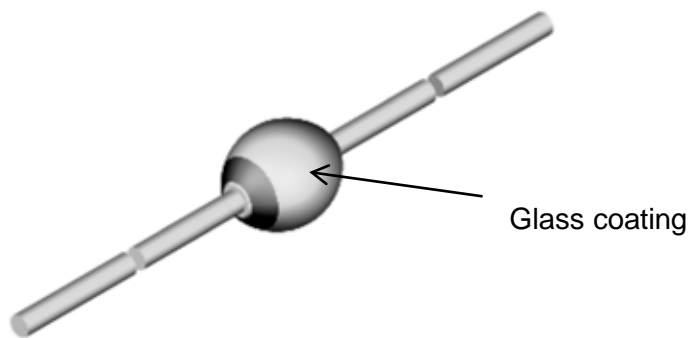
3. Summary of the exemption extension request / revocation request

This exemption renewal request is for the use of lead in high reliability semiconductor power device passivation and packaging. Lead based glasses are used because they have unique combinations and characteristics that cannot be achieved by other materials or methods.

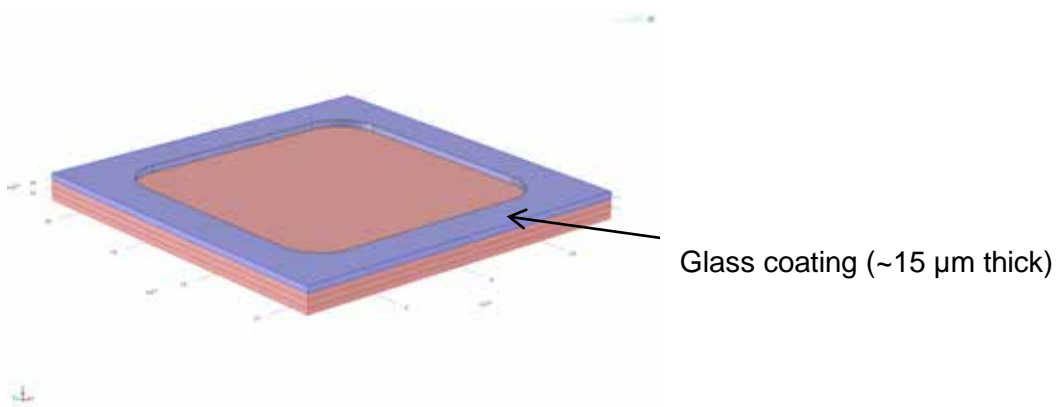
4. Technical description of the exemption request / revocation request

Zinc borosilicate glasses with lead are used to prevent degradation of high reliability semiconductor devices in applications at or above 100 Vac for rectification and other electric power converters.

Examples. Diode in SOD-57 case:



Silicon diode die (~10x10 mm²)



(A) Description of the concerned application:

1. To which EEE is the exemption request/information relevant?

Name of applications or products: all kind of **EEEs**

a. List of relevant categories: (mark more than one where applicable)

- | | |
|---------------------------------------|--|
| <input checked="" type="checkbox"/> 1 | <input checked="" type="checkbox"/> 7 |
| <input checked="" type="checkbox"/> 2 | <input checked="" type="checkbox"/> 8 |
| <input checked="" type="checkbox"/> 3 | <input checked="" type="checkbox"/> 9 |
| <input checked="" type="checkbox"/> 4 | <input checked="" type="checkbox"/> 10 |
| <input checked="" type="checkbox"/> 5 | <input checked="" type="checkbox"/> 11 |
| <input checked="" type="checkbox"/> 6 | |

b. Please specify if application is in use in other categories to which the exemption request does not refer: **transportation, automotive, high power equipment in the industry.**

c. Please specify for equipment of category 8 and 9:

The requested exemption will be applied in

monitoring and control instruments in industry

in-vitro diagnostics

other medical devices or other monitoring and control instruments than those in industry

2. Which of the six substances is in use in the application/product?

(Indicate more than one where applicable)

Pb Cd Hg Cr-VI PBB PBDE

3. Function of the substance: providing protection from environmental effects on semiconductor die

4. Content of substance in homogeneous material (%weight): <10% of lead

5. Amount of substance entering the EU market annually through application for which the exemption is requested: ~ 1000 kg

6. Name of material/component: glass coating

7. Environmental Assessment: as part of EEEs

LCA: Yes
 No

(B) In which material and/or component is the RoHS-regulated substance used, for which you request the exemption or its revocation? What is the function of this material or component?

AC and DC power semiconductor devices

(C) What are the particular characteristics and functions of the RoHS-regulated substance that require its use in this material or component?

Good physical properties in combination with pure silicon crystals and good withstand ability against high electric fields in the range of 200 000 V/cm.

5. Information on Possible preparation for reuse or recycling of waste from EEE and on provisions for appropriate treatment of waste

1) Please indicate if a closed loop system exist for EEE waste of application exists and provide information of its characteristics (method of collection to ensure closed loop, method of treatment, etc.)

2) Please indicate where relevant:

- Article is collected and sent without dismantling for recycling
 Article is collected and completely refurbished for reuse
 Article is collected and dismantled:
 The following parts are refurbished for use as spare parts: _____
 The following parts are subsequently recycled: _____
 Article cannot be recycled and is therefore:
 Sent for energy return
 Landfilled

3) Please provide information concerning the amount (weight) of RoHS substance present in EEE waste accumulates per annum:

- In articles which are refurbished _____
 In articles which are recycled _____
 In articles which are sent for energy return _____
 In articles which are landfilled _____

6. Analysis of possible alternative substances

(A) Please provide information if possible alternative applications or alternatives for use of RoHS substances in application exist. Please elaborate analysis on a life-cycle basis, including where available information about independent research, peer-review studies development activities undertaken

New passivation systems are under development, e. g. diamond like carbon coatings or amorphous silicon-oxide layers.

(B) Please provide information and data to establish reliability of possible substitutes of application and of RoHS materials in application

Long term stability in various environments, workability and fabrication equipment is under research and development.

7. Proposed actions to develop possible substitutes

(A) Please provide information if actions have been taken to develop further possible alternatives for the application or alternatives for RoHS substances in the application.

IXYS is working on this subject as explained above.

(B) Please elaborate what stages are necessary for establishment of possible substitute and respective timeframe needed for completion of such stages.

Fabrication equipment needs further work and long term tests and field experience need to be established.

8. Justification according to Article 5(1)(a):

(A) Links to REACH: (substance + substitute)

1) Do any of the following provisions apply to the application described under (A) and (C)?

- Authorisation
 - SVHC
 - Candidate list
 - Proposal inclusion Annex XIV
 - Annex XIV
- Restriction
 - Annex XVII
 - Registry of intentions
- Registration

2) Provide REACH-relevant information received through the supply chain.

Name of document: _____

(B) Elimination/substitution:

1. Can the substance named under 4.(A)1 be eliminated?

Yes. Consequences? _____

No. Justification: _____

2. Can the substance named under 4.(A)1 be substituted?

Yes.

Design changes:

Other materials:

Other substance:

No.

Justification: _____

3. Give details on the reliability of substitutes (technical data + information): _____

4. Describe environmental assessment of substance from 4.(A)1 and possible substitutes with regard to

1) Environmental impacts: _____

2) Health impacts: _____

3) Consumer safety impacts: _____

Do impacts of substitution outweigh benefits thereof?

Please provide third-party verified assessment on this: _____

(C) Availability of substitutes:

a) Describe supply sources for substitutes: _____

b) Have you encountered problems with the availability? Describe: _____

c) Do you consider the price of the substitute to be a problem for the availability?

Yes No

d) What conditions need to be fulfilled to ensure the availability? _____

(D) Socio-economic impact of substitution:

What kind of economic effects do you consider related to substitution?

Increase in direct production costs

Increase in fixed costs

Increase in overhead

Possible social impacts within the EU

Possible social impacts external to the EU

Other: _____

Provide sufficient evidence (third-party verified) to support your statement: _____

9. Other relevant information

Please provide additional relevant information to further establish the necessity of your request:

10. Information that should be regarded as proprietary

Please state clearly whether any of the above information should be regarded to as proprietary information. If so, please provide verifiable justification:
