

## Consultation Questionnaire Exemption No. 7a (renewal request)

***Exemption for „Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)“***

### Acronyms and Definitions

DCB	direct copper bonding, sometimes also “direct bonded copper (DBC)
HMPS	high melting point solder
LHMPS	lead-containing high melting point solder
Pb	lead
SMT	surface mount technology

### Background

The Oeko-Institut and Fraunhofer IZM have been appointed within a framework contract<sup>1</sup> 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.<sup>1</sup>

Bourns, Freescale and Ixys submitted a request for the renewal of the above mentioned exemption, which has been subject to a first completeness and plausibility check. The applicants have 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=244>).

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, the original exemption requests, and answer the following questions.

### Summary of Exemption Requests

#### History of the Exemption

The exemption was already listed in the Annex of directive 2002/95/EC (RoHS 1) as Ex. 7 with the exact same wording when RoHS 1 entered into force in 2003. The exemption was reviewed once in the past in 2008/2009.<sup>2</sup>

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

The reviewers stated that “Exemption 7a, contrary to other exemptions in the annex of the RoHS Directive, is not application, technology or use specific, but material specific. It generally allows the use of high melting point solders with 85% of lead (HMP solders) and more in electrical and electronic equipment wherever manufacturers want to use it.

In several applications, the substitution or elimination of the HMP solders at the current state of science and technology is impracticable. The exemption for such HMP solders therefore is fully justified for these cases according to the criteria of Art. 5(1)(b) of the RoHS Directive [2002/95/EC, the reviewers]. However, there are hints that HMP solders are used where alternative solutions reducing the amounts of lead are available.

1. The current general exemption for lead in HMP solders offers a loophole to bypass the use of lead-free solders or to avoid searching for other RoHS-compliant solutions that do not require the use of lead.
2. The current general exemption unnecessarily increases the use of lead in applications, where lead-free solutions are technically impracticable and an exemption for the use of lower lead content solders would be possible or is already in place.”

[...] The reviewers propose leaving the exemption unchanged for now, but giving it an expiry date, which allows industry a reasonable time frame to apply for specific exemptions for the use of lead in HMP solders, where they are justifiable by the requirements set out in Art. 5 (1) (b). The expiry date must allow for the application and technology specific exemptions to be in place before the material specific exemption ends.”<sup>3</sup>

The reviewers recommended in 2008/2009 to continue the exemption with the same wording, but set an expiry date on 30 June 2013. The Commission decided to continue the exemption without specifying an expiry date. The exemption was transferred to Annex III of the recast RoHS 2, which systematically elongated the maximum validity period to July 2016.

### Summary of the Current Exemption Requests

All applicants request the exemption be renewed with the same wording. According to the applicants, LHMPs has a great variety of applications, and there are currently neither lead-free substitutes available to replace LHMPs, nor alternative technologies to eliminate its use. All applicants request the continuation of the exemption without restriction in scope or specification of the exemption into the various application fields in order to transfer it from the currently generic character toward specific exemptions following the example of most other exemptions in Annex III of the RoHS Directive.

Nevertheless, Ixys, one of the applicants for the continuation of exemption 7a), states that electrically isolated package versions in DCB technology with metal bonded alumina or AlN ceramic isolator substrates have a better CTE match and more SAC type solders can be used. This technology combines copper with ceramics like alumina without any interface material (BBC/IXYS patent EP85914 and other patents, see application Ixys, document “DE1944181A\_BBC.PDF”, available only in German). According to Ixys, the application fields are described here: <http://www.ixys.com/SearchResults.aspx?search=ISOPLUS&SearchSubmit=Go>

<sup>2</sup> Carl-Otto Gensch et al., Oeko-Institut e. V. (2009), *Adaptation to scientific and technical progress under Directive 2002/95/EC: Final Report*. With the assistance of Stéphanie Zangl, Rita Groß, Anna Weber, Öko-Institut e. V. and Otmar Deubzer, Fraunhofer IZM. Freiburg: . Accessed July 14, 2015. [http://ec.europa.eu/environment/waste/weee/pdf/final\\_report\\_rohs1\\_en.pdf](http://ec.europa.eu/environment/waste/weee/pdf/final_report_rohs1_en.pdf); [http://ec.europa.eu/environment/waste/weee/pdf/report\\_2009.pdf](http://ec.europa.eu/environment/waste/weee/pdf/report_2009.pdf), page 76 et seqq.

<sup>3</sup> Gensch et al. (2009); [http://ec.europa.eu/environment/waste/weee/pdf/report\\_2009.pdf](http://ec.europa.eu/environment/waste/weee/pdf/report_2009.pdf), page 85 and 86

Ixys mentions, however, that ISOPLUS devices for applications in the SMT (surface mount technology) need LHMPS for internal connections. This is due to the fact that during SMT processing the devices have to survive temperatures exceeding the lead free SAC melting point (see also IEC 60749-20, table 6 and Fig. B.9 as well as IEC61190-1-3, table B.2 in the application of Ixys). Otherwise any internal lead free solder connections in the plastic molded devices would remelt and degrade their quality.

Ixys states that many of its customers still require cheaper non-isolated versions because of the lower price, implying that design changes in customers' products might enable applying this technology and thus reduce or avoid the use of LHMPS.

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

<http://rohs.exemptions.oeko.info/index.php?id=244>

## Questions

1. Please comment on Ixys' claim that DCB can be a lead-free alternative to LHMPS.
2. Please provide information concerning possible other substitutes or developments that may enable reduction, substitution or elimination, at present or in the future, of "Lead in high melting temperature type solders";
  - a. In this regard, please provide information as to alternatives that may cover part or all of the applicability range of lead in high melting point solders;
  - b. Please provide quantitative data as to application specifications to support your view.
3. The applicants requested the renewal of exemption No. 7a of Annex III with the same wording:

*"Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)"*

  - a. Do you agree with the scope and proposed formulation of the exemption as proposed by the applicants? Please take into account the answers to questions 1 and 2.
  - b. Please suggest an alternative wording and explain your proposal, if you do not agree with the proposed exemption wording.
  - c. Please explain why you either support the applicants' request or object to it. To support your views, please provide detailed technical argumentation / evidence in line with the criteria in RoHS Art. 5(1)(a) to support your statement.
4. Please provide information as to research initiatives which are currently looking into the development of possible alternatives for some or all of the application range of Lead in high melting temperature type solders.
  - a. Please explain what part of the application range is of relevance for such initiatives (in what applications may substitution be possible in the future).

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

5. So far, the following application fields have been identified for LHMPs:

- I. Internal electrical interconnections within an electronic component
- II. Die attach
- III. Plastic overmoulding
- IV. Ceramic BGAs
- V. High power applications
- VI. Solders for mounting electronic components onto sub-assembled modules or sub-circuit boards
- VII. Solders used as a hermetic sealing material between a ceramic package or plug and a metal case

If the provided information suggests that the scope of exemption 7a should be specified, please explain whether the above application specification is exhaustive, otherwise complete it or propose a different specification.

6. Are there any other aspects you deem to be of importance for 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

(Carl-Otto Gensch, Öko-Institut e. V., et al. 19 February 2009) *Adaptation to scientific and technical progress under Directive 2002/95/EC: Final Report*. With the assistance of Stéphanie Zangl, Rita Groß, Anna Weber, Öko-Institut e. V. and Otmar Deubzer, Fraunhofer IZM. Freiburg: . Accessed July 14, 2015. [http://ec.europa.eu/environment/waste/wEEE/pdf/final\\_reportl\\_rohs1\\_en.pdf](http://ec.europa.eu/environment/waste/wEEE/pdf/final_reportl_rohs1_en.pdf); [http://ec.europa.eu/environment/waste/wEEE/pdf/report\\_2009.pdf](http://ec.europa.eu/environment/waste/wEEE/pdf/report_2009.pdf)