

# Consultation Questionnaire Exemption 7(a) of RoHS Annex III

**Table 1: Currently valid wording of the exemption**

No.	Exemption	Scope and dates of applicability
III-7(a)	Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)	<p>Applies to categories 1 to 11 (except applications covered by point 24 of this Annex) and expires on</p> <ul style="list-style-type: none"> <li>- 21 July 2021 for categories 1 to 7 and 10, and for category 8 other than in vitro diagnostic medical devices and cat. 9 other than industrial monitoring and control instruments</li> <li>- 21 July 2023 for category 8 in vitro diagnostic medical devices;</li> <li>- 21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11</li> </ul>

## Acronyms and Definitions

Cat.	Category, referring to the categories of EEE specified in Annex II of the current RoHS Directive
COM	European Commission
EEE	Electrical and electronic equipment
HMPS	High melting point solders
IMCI	Industrial monitoring and control instrument
Lead-free	Not containing lead in the application in scope of the exemption to be reviewed
NRMM	Non-road mobile machinery (NRMM)

# 1. Background and objectives of this review

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

TMC requested the renewal of exemption 7(a) with its current wording for the maximum validity of seven years for cat. 9 industrial monitoring and control instruments (IMCIs). EUROMOT request the renewal of exemption 7(a) for the maximum validity period of five years respectively for cat. 11 with a scope that is specified for the applications of its members (Table 2). The National Association of Manufacturers (NAM) support EUROMOT's request.

**Table 2: Requested exemption renewal**

No.	Requested exemption	Requested scope and dates of applicability
III-7(a)	<i>Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more of lead) used in engines, engine components and ancillary components and in end-products in which they are used</i>	<i>Applies to category 11 and expires on 21 July 2029 (= 2024 + 5 years)</i>

The applicants were requested to respond to clarification questionnaires prior to this stakeholder consultation to complete missing information. These questionnaires along with the exemption applications and – if submitted - supporting evidence from other stakeholders are accessible on the consultation web page.

The stakeholder consultation is part of the review process for the exemption request at hand. It addresses third parties – not the applicants – to provide and to evaluate information and evidence according to the criteria listed in Art. 5(1)(a) of Directive 2011/65/EU.<sup>2</sup>

Exemption 7(a) was reviewed by Baron et al. (2022)<sup>3</sup>, who recommended to renew the exemption as illustrated in the below table.

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

<sup>3</sup> C.f. Öko-Institut, [https://rohs.exemptions.oeko.info/fileadmin/user\\_upload/RoHS\\_Pack\\_22/RoHS\\_Pack-22\\_final\\_report\\_amended\\_February\\_2022.pdf](https://rohs.exemptions.oeko.info/fileadmin/user_upload/RoHS_Pack_22/RoHS_Pack-22_final_report_amended_February_2022.pdf)

**Table 3: Recommended renewal of exemption 7(a) in the last review in 2022**

Exemption formulation 7(a)	Duration
<p>Lead in high melting temperature type solders (i.e., lead-based alloys containing 85 % by weight or more lead) (excludes those in the scope of exemption 24)</p>	<p>For all categories except applications covered by point 24 of this Annex, expires on 21 July 2024.</p>
<p><i>Lead in high melting temperature type solders (i.e., lead-based alloys containing 85 % by weight or more lead) when used for the following applications (excludes those in the scope of exemption 24):</i></p> <p><i>I) for internal interconnections for attaching die, or other components along with a die in semiconductor assembly with steady state or transient/impulse currents of 0.1 A or greater or blocking voltages beyond 10 V, or die edge sizes larger than 0.3 mm x 0.3 mm</i></p> <p><i>II) for integral (meaning internal and external) connections of die attach in electrical and electronic components, if the thermal conductivity of the cured/sintered die-attach material is <math>&gt;35W/(m*K)</math> AND the electrical conductivity of the cured/sintered die-attach material shall be <math>&gt;4.7MS/m</math> AND solidus melting temperature has to be above 260°C</i></p> <p><i>III) In first level solder joints (internal or integral connections - meaning internal and external) for manufacturing components so that subsequent mounting of electronic components onto subassemblies (i.e., modules or sub-circuit boards or substrates or point to point soldering) with a secondary solder does not reflow the first level solder. This item excludes die attach applications and hermetic sealings</i></p> <p><i>IV) In second level solder joints for the attachment of components to printed circuit board or lead frames:</i></p> <ol style="list-style-type: none"> <li><i>1. in solder balls for the attachment of ceramic ball-grid-array (BGA)</i></li> <li><i>2. in high temperature plastic overmouldings (<math>&gt; 220\text{ }^{\circ}C</math>)</i></li> </ol> <p><i>V) as a hermetic sealing material between:</i></p> <ol style="list-style-type: none"> <li><i>1. a ceramic package or plug and a metal case,</i></li> <li><i>2. component terminations and an internal sub-part</i></li> </ol> <p><i>VI) for establishing electrical connections between lamp components in incandescent reflector lamps for infrared heating or high intensity discharge lamps or oven lamps</i></p> <p><i>VII) for audio transducers where the peak operating temperature exceeds 200°C</i></p>	<p>Applies to all categories except applications covered by point 24 of this Annex, expires on 21 July 2026.</p>

Source: Baron et al. (2022)

The European Commission (COM) have not yet officially published their decision as to the adoption of the above recommendation. The COM wishes the consultants to assess in this current review round whether there are any substantial reasons in line with Art. 5(1)(a) against the adoption of the above recommendation for EEE of categories 8, 9 and 11. This implies that the consultants will assess whether the validities of exemptions whose renewal is requested for cat. 8, 9 or 11 may exceed the validities recommended in the previous review (Table 3). Table 4 reflects the potential scope and wordings if the exemptions are renewed for cat. 9 IMCI and for cat. 11.

**Table 4: Renewal of current exemption 7(a) for cat. 9 and 11 based on the recommendation in the last review in 2022**

No.	Recommended Exemption	Recommended scope and dates of applicability
III-7(a)	Lead in high melting temperature type solders (i.e., lead-based alloys containing 85 % by weight or more lead)	Applies to all categories but excluding applications covered by exemption 24 of this Annex.  Expires on 21 July 2024 for all categories
III-7(d)	<p>Lead in high melting temperature type solders (i.e., lead-based alloys containing 85 % by weight or more lead) when used for the following applications, excluding those in the scope of exemption 24:</p> <p>I) For internal interconnections for attaching die, or other components along with a die in semiconductor assembly with steady state or transient/impulse currents of 0.1 A or greater or blocking voltages beyond 10 V, or die edge sizes larger than 0.3 mm x 0.3 mm</p> <p>II) For integral (meaning internal and external) connections of die attach in electrical and electronic components, if the thermal conductivity of the cured/sintered die-attach material is &gt;35 W/(m*K) AND the electrical conductivity of the cured/sintered die-attach material shall be &gt;4.7 MS/m AND solidus melting temperature has to be above 260°C</p> <p>III) In first level solder joints (internal or integral connections - meaning internal and external) for manufacturing components so that subsequent mounting of electronic components onto subassemblies (i.e., modules or sub-circuit boards or substrates or point to point soldering) with a secondary solder does not reflow the first level solder. This item excludes die attach applications and hermetic sealings</p> <p>IV) In second level solder joints for the attachment of components to printed circuit boards or lead frames:</p> <p>1. In solder balls for the attachment of ceramic ball-grid-array (BGA)</p> <p>2. In high temperature plastic overmouldings (&gt;220 °C)</p> <p>V) As a hermetic sealing material between:</p> <p>3. A ceramic package or plug and a metal case,</p> <p>4. A component termination and an internal sub-part</p> <p>VI) For establishing electrical connections between lamp components in incandescent reflector lamps for infrared heating or high intensity discharge lamps or oven lamps</p>	<p>Applies to categories 1 to 11 from 22 July 2024 on.</p> <p>Expires on</p> <ul style="list-style-type: none"> <li>- 21 July 2026 for categories 1 to 8 and 10.</li> <li>- 21 July [2026 + X] for cat. 11.</li> <li>- 21 July [2026 + Y] for cat. 9 IMCI.</li> </ul>

VII) For audio transducers where the peak operating temperature exceeds 200 °C
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X can be maximum 3 years

Y can be maximum 5 years

**To contribute to this stakeholder consultation, please answer the below questions until 11 December 2023.**

**Please also see the applicants' request form and clarification questionnaire response and – if submitted – further information on the consultation web page<sup>4</sup>.**

## 2. Questions

1) *EUROMOT state in their answers to the clarification questionnaire that the scope of exemption 7(d) is likely to be too restrictive for their members uses of high melting point solders (HMPS). EUROMOT members are not able to determine if all lead-high melting point solders are captured by the proposed 7(d) as they use a wide variety of electronic components utilising exemption 7(a), but electronics suppliers do not provide information as to whether this is covered by 7(d). EUROMOT therefore request the renewal of exemption 7(a) for five years.*

a. Do you agree to the above reasoning?

**Yes, we agree. To our opinion, the splitting of III 7(a) into several subclauses in a new formulation as III 7(d) I – VII is probably too narrow for all possible applications of HMPS.**

b. The proposed exemption 7(d) is not intended to restrict the scope compared to exemption 7(a) where no lead-free alternatives are available but to specify the applications where HMPS is used.

Do you know of any applications of HMPS in cat 11 or other categories which exemption 7(d) would not cover?

**SRT uses HMPS for wires in high ohmic resistors in a lot of different applications. Among them are applications for test and measurement devices, medical applications (electronics for X-ray tubes) and others, we do not know. In these cases III 7(d) III should cover the “standard” subsequent manufacturing steps. But this point of view is probably too narrow for all the possible variety of electronic manufacturing. A single distinct application who is not covered by 7(d) is not known by us; but customers often do not tell us the intended use and way of assembly.**

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<sup>4</sup> Consultation web page: <https://rohs.biois.eu/requests2.html>

- 2) TMC do not agree to the proposed exemption wordings of exemptions 7(d) to be applied to cat. 9 IMCIs. They state that they applied for the renewal of the current exemption 7(a). Lead is a significant ingredient of the solder alloys used to electrically or physically join two elements. High Melting Point (HMP) solders are used for a wide variety of applications. Based on the application type, a lead amount of >85% is required to achieve the necessary melting temperature and to obtain other material properties.

*There is no single substitute available that would be suitable for all the applications identified and match the technical performance of lead. Currently, substitutes for even the major uses have rarely been found. Evaluating alternatives for each of the niche uses would take an enormous amount of time and resources, with little probability of success. TMC therefore apply for the renewal of exemption 7(a) for the **maximum** renewal period.*

- a. Do you agree to the above reasoning?

**Yes, we agree to the above reasoning. SRT as a very small company has a big variety of wired resistors for a lot of different applications, which are only known to us to a small extent. For all these resistors HMPS is used. Other bigger companies may have thousands of products with ten thousands of modifications, which all use HMPS as internal electrical and mechanical connection. For SRT other connection technologies, which effectively establish a reliable and versatile connection of (copper) wires to a thin layer of AgPd onto a ceramic substrate is likely to either destroy the ceramic or to have a low reliability.**

**If it might be possible to substitute a few of all these possible solder connections with other means (e.g. welding, glueing,...), then this will lead very likely to strong restriction of the product to only a few realizable configurations. For example small size might be impossible or only one direction/one size of the wires or only possible with thick ceramic substrate and so on. This implies that a huge wave of redesigns will happen and/or some products will be quited at all.**

- b. The proposed exemption 7(d) is not intended to restrict the scope compared to exemption 7(a) where no lead-free alternatives are available but to specify the applications where HMPS is used.

**To our opinion, the new formulation may not cover all the possible solutions which are in use.**

- c. Do you know of any applications of HMPS in cat cat. 9 IMCIs which exemption 7(d) would not cover?

**See answer in 2 1b**

- 3) Looking at all categories of EEE (1 to 11): Are you aware of any applications of lead in the scope of the current exemption 7(a) that require the use of lead but would not be covered by the scope of the recommended exemption 7(d)?

**See answer in 2 1b**

4) As part of the evaluation, socio-economic impacts shall also be compiled and evaluated. For this purpose, if you have additional information on socioeconomic aspects that are expected to arise if the exemption is not granted as requested by EUROMOT, 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?

**No additional information**

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?

**No additional information**

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.

**If the exemption is not renewed, we will have to reduce our portfolio to a small variety – if any other connection technology is feasible and reliable at all. This will lead to less customers. At the end we have to decide, if this portfolio with wired resistors is still economical for SRT.**

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).

**Additional cost will arise for SRT in developing a new connection technology – with open end; this is valid then for all other companies too. For a small company as SRT it is even more a question of economical logic than for bigger companies, which could to some extend finance across several business units. Finally the decision if this development will be done or not is a question of ROI (return of invest).**

5) TMC provided a socioeconomic analysis related to the above exemption request. The document is available online in the consultation folder for this exemption.

Do you agree with the underlying method, data and conclusions?

**No additional information**

6) Any additional information which you would like to provide?

**Please note that answers to these questions can be published on the stakeholder consultation website and in the review report. 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.**

**It would be helpful for the review process if you could kindly provide the information in formats that allow copying text, figures and tables to be included in the review report.**