Consultation Questionnaire   
Exemption 44 of RoHS Annex III

Table 1 shows the current wording of the exemption on Annex III of the RoHS Directive.

Table 1: Currently valid exemption wording

|  |  |  |
| --- | --- | --- |
| No. | Current exemption wording | Current scope and dates of applicability |

|  |  |  |
| --- | --- | --- |
| III-44 | Lead in solder of sensors, actuators, and engine control units of combustion engines within the scope of Regulation (EU) 2016/1628 of the European Parliament and of the Council ([[1]](#footnote-2)), installed in equipment used at fixed positions while in operation which is designed for professionals, but also used by non-professional users | Applies to category 11 and expires on 21 July 2024. |

# ACRONYMS AND DEFINITIONS

BGA Ball grid array (a specific surface-mount chip package used for integrated circuits)

COM European Commission

ECU Engine control unit

EEE Electrical and electronic equipment

# Background and objectives of this review

Bio Innovation Service, UNITAR-SCYCLE and Fraunhofer IZM have been appointed[[2]](#footnote-3) by the European Commission for the evaluation of new exemptions and the renewal of exemptions currently listed in Annexes III and IV of the RoHS Directive 2011/65/EU.

EUROMOT submitted a request for renewal of the above exemption for cat. 11 with the wording, scope and validity period shown in the below table:

Table 2: Requested exemption renewal

|  |  |  |
| --- | --- | --- |
| No. | Requested exemption | Requested scope and dates of applicability |
| *III-44* | *Lead in solder of engine control units of combustion engines, installed in equipment used at fixed positions while in operation which is designed for professionals, but also used by non-professional users* | *Applies to category 11; expires on 21 January 2027.* |

EUROMOT provided the following summary of their renewal request:

*“Lead is used in solder to make electrical connections to components in engine control units (ECUs). Work has been undertaken since the last exemption renewal to qualify lead-free solder in sensor and actuators, which were previously in scope of the exemption. However, more time is necessary to undertake the qualification of lead-free solder in ECUs.*

*ECUs are generally mounted on the engine block and as such experience a harsh operational environment which includes severe vibration and temperature fluctuations from -40⁰C to 105⁰C or greater for prolonged periods of time. Lead containing solder is known to provide resistance to failures due to thermal cycling, vibration and shock, does not form whiskers which could cause short circuits, while still having a low but sharp melting point such that it can be applied to PCB’s without damaging any components.*

*Manufacturers designing new ECUs, are designed with lead-free solder. However legacy ECUs requires testing and usually also circuit redesign and component substitutions to ensure that the ECUs will be reliable for many decades in demanding environments. EUROMOT members produce equipment designed to voluntary consensus safety standards and subject to third party certifications, customer requirements, and regulatory testing obligations. Changes to the solder can affect function, performance, or safety and as such must undergo extensive testing to ensure it meets internal quality benchmarks, design specifications, and regulatory requirements.*

*The type of ECU, engine and end-use equipment determines the types of tests that are required, with each manufacturer requiring their own testing regime. Testing is underway by EUROMOT members, but additional time is required for these to be completed.”*

The applicants were requested to respond to a clarification questionnaire prior to this stakeholder consultation to provide missing information. This questionnaire, 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 requests at hand. It addresses third parties – not the applicants – to collect and to evaluate information and evidence according to the criteria listed in Art. 5(1)(a) of Directive 2011/65/EU.[[3]](#footnote-4)

**To contribute to this stakeholder consultation, please answer the below questions until** **19 January 2024. Please also see the applicants’ request form and clarification questionnaire response on the consultation web page[[4]](#footnote-5).**

# Questions

1. Do you agree that this exemption is required for engine control units in scope of RoHS Annex I cat. 11 for the applied for validity period until January 2027? Please support your views with detailed technical argumentation / evidence in line with the criteria in Art. 5(1)(a).
2. The new wording proposed by EUROMOT omits the reference to Regulation (EU) 2016/1628, which is included in the currently valid exemption wording. Do you agree with EUROMOT’s wording proposal? What are the consequences to this change, in your view?
3. EUROMOT explained in their renewal request that engine control units (ECUs) with lead-free solder are available on the market, but argue that it is not possible to replace leaded solder in existing designs: *“When manufacturers design new ECUs, these are designed with the use of lead-free solders. However, simply replacing lead solder with lead-free solder in existing designs is usually impossible and risks early failures and so any change in materials requires extensive testing and usually also circuit redesign and component substitutions to ensure that the ECUs will be reliable for many decades in demanding environments. One challenge is that tin-lead BGAs are usually older designs often without lead-free equivalents and so new circuit designs are needed to accommodate alternative types of BGAs.”*
4. Are you aware of the typical redesign cycles of engine control units? Are redesign cycles typically concurrent to redesign cycles of engines for which they are designed?
5. Are you aware of OEMs that manufacture ECUs and components relevant for this exemption renewal request that do not need the exemption for lead-containing solders?
6. EUROMOT explained in their renewal request that the challenging environment for ECUs, such as extreme heat and vibrations, are due to their mounting on the engine block. They further explain that for some applications, it is not possible to mount ECUs away of the engine block where the environmental loads would be reduced. The reasons for this can be summarized as a) the engine block is the only location which is capable for mounting the ECU, and b) additional cable length for remote mounting introduces challenges with electronmagnetic interference and other electrical and mechanical failure modes.
7. Do you agree with EUROMOT’s position on this issue? Can you provide evidence that would support or contradict it?
8. The amount of lead entering the EU market through applications in scope of exemption 44 estimated by EUROMOT (1.66 kg) are significantly lower than estimated amounts provided in the original exemption request (> 2 tonnes). EUROMOT have accounted for reasons for this reported difference in their response to the clarification questionnaire. Do you have any information to support or complement the basis for these estimates?
9. Is there 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.**

1. Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC (OJ L 252, 16.9.2016, p. 53). [↑](#footnote-ref-2)
2. It is implemented through the specific contract 070201/2020/832829/ENV.B.3 under the Framework contract ENV.B.3/FRA/2019/0017 [↑](#footnote-ref-3)
3. Directive 2011/65/EU (RoHS) available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32011L0065:EN:NOT> [↑](#footnote-ref-4)
4. Consultation web page: <https://rohs.biois.eu/requests2b.html> [↑](#footnote-ref-5)