



Department
for Environment
Food & Rural Affairs

Exemption for lead solder in control units of combustion engines

March 2025

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We work closely with our 33 agencies and arm's length bodies on our ambition to make our air purer, our water cleaner, our land greener and our food more sustainable. Our mission is to restore and enhance the environment for the next generation, and to leave the environment in a better state than we found it.



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Introduction

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (RoHS regulations) restricts the use of 10 hazardous substances in electrical and electronic equipment (EEE), with a view to contributing to the protection of human health and the environment, including the sound recovery and disposal of waste.

Industry can apply for exemptions to allow the supply of products using one or more of the restricted substances above the threshold limits set down in the RoHS regulations where specified criteria are met. Applications for exemptions are made to the Secretary of State under regulation 6 of the Hazardous Substances and Packaging (Legislative Functions and Amendment) (EU Exit) Regulations 2020 (2020 regulations). Any exemption that is granted can be used across industry, not just by the business that applied for the exemption. Exemptions are granted where it is determined that the necessary criteria have been met following a detailed evaluation conducted in accordance with regulation 5 of the 2020 regulations.

Following the UK's withdrawal from the EU, the function of granting, renewing and revoking exemptions were, in relation to Great Britain (England, Scotland and Wales), transferred to the Secretary of State by the 2020 regulations, using powers in section 8 of the European Union (Withdrawal) Act 2018 (Withdrawal Act).

Part of the evaluation process is an 8-week consultation to collect contributions from stakeholders.

An exemption renewal request was submitted on 20 January 2023 for the use of 'Lead in solder of sensors, actuators, and engine control units of combustion engines within the scope of Regulation (EU) 2016/1628¹ of the European Parliament and of the Council, installed in equipment used at fixed positions while in operation which is designed for professionals, but also used by non-professional users.

The requested duration of the exemption is until January 2027, and according to the application it would be expected to lead to the introduction of 0.123kg of lead to the GB market annually.

The exemption covers applications under category 11 (other) of electrical and electronic equipment (EEE), as covered in the 2012 RoHS regulations.

¹ Requirements relating to gaseous and particulate pollutant emission limits and type approval for internal combustion engines for non-road mobile machinery

Purpose of this consultation

The purpose of this consultation is to seek views on the request for the renewal of an exemption to the substance restrictions in the RoHS regulations, to collect additional data and information, and to inform stakeholders about the application.

Geographical extent

We are consulting on proposals applicable to England, Wales and Scotland only. The Secretary of State's transferred function only applies in relation to England, Scotland and Wales.

Northern Ireland is out of scope of this consultation. This is because the [EU RoHS Directive](#) is covered under the Windsor Framework agreement with the EU. As such, the EU RoHS Directive continues to apply in Northern Ireland and Northern Ireland continues to be bound by exemption decisions made by the EU.

Audience

This is a public consultation, and we welcome all views, particularly views from the electrical and electronic equipment manufacturing and supply industry, and relevant trade bodies, organisations who use the equipment in question, research institutions and universities, non-governmental organisations (NGOs) and public administrations.

Responding to this consultation

You can respond to this consultation online using [Defra's Citizen Space consultation hub](#).

For ease of analysis, responses via the Citizen Space platform would be preferred, but an alternative option is provided below if required.

Email: rohs@defra.gov.GB

Responses must arrive by the closing date of the consultation (4 May 2025) to be counted. Any responses received after this date will not be analysed. To ensure your response is included in the analysis, consider responding online at [Citizen Space](#).

Further exchange with stakeholders will be held after the consultation has ended for those issues where further need for information or (technical) discussion has been identified.

Duration

This consultation will be open for 8 weeks from 10 March 2025 until 4 May 2025.

Confidentiality and data protection information

A summary of responses to this consultation will be published on the government website at: www.gov.uk/defra. An annex to the consultation summary will list all organisations that responded, but will not include personal names, addresses or other contact details. Defra may publish the content of your response to this consultation to make it available to the public without your personal name and private contact details (for example, your home address or email address).

If you would like anything in your response to be treated as confidential, please say so clearly in writing when you submit your response to the consultation and explain why you require these details to be kept confidential. The reason for this is that information in response to this consultation may be subject to release to the public or other parties in accordance with access to information laws. These are primarily the Environmental Information Regulations 2004 (EIRs), the Freedom of Information Act 2000 (FOIA) and the Data Protection Act 2018 (DPA).

We have obligations, mainly under the EIRs, FOIA and DPA, to disclose information to particular recipients or to the public in certain circumstances. In view of this, your explanation of your reasons for requesting confidentiality for all or part of your response would help us balance these obligations for disclosure against any obligation of confidentiality. If we receive a request for the information that you have provided in your response to this consultation, we will take full account of your reasons for requesting confidentiality of your response, but we cannot guarantee that confidentiality can be maintained in all circumstances.

If you select 'No' in response to the question asking if you would like anything in your response to be kept confidential, we will be able to release the content of your response to the public, but we won't make your personal name and private contact details publicly available.

There may be occasions when Defra will share the information you provide in response to the consultation, including any personal data with external analysts. This is for the purposes of consultation response analysis and provision of a report of the summary of responses only. This consultation is being conducted in line with the Cabinet Office [Consultation Principles](#).

Find our latest privacy notice uploaded as a related document alongside our consultation document.

If you have any comments or complaints about the consultation process, email consultation.coordinator@defra.gov.uk. Use the subject line: Consultation on amendments to the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations – lead in solder of engine control units.

After the consultation

A summary of the non-confidential responses to this consultation and the government response will be published and placed on the government website at www.gov.uk/defra

The summary will include a list of respondents and organisations that responded, but not personal names, addresses or other contact details. However, information provided in response to this consultation document, including personal information, will be shared with the Devolved Administrations and may be subject to publication or release to other parties or to disclosure in accordance with the access to information regimes, for example Freedom of Information Act 2000 (FOIA) and the Data Protection Act 2018.

About you

A wide range of businesses, organisations and individuals are involved with or take an interest in the supply of electrical equipment. The questions below are intended to put your responses in perspective with those of other respondents.

Q1. Would you like your response to be confidential?

Yes or No.

- If you answered 'Yes', please provide your reason.

Q2. What is your name?

Q3. What is your email address?

This is optional, but if you enter your email address you will be able to return to edit your consultation response in Citizen Space at any time until you submit it. You will also receive an acknowledgement email when you submit a completed response.

Q4. Which best describes you?

Provide the name of the organisation or business you represent and the approximate size or number of staff (where applicable). (Select one option. If multiple categories apply, choose the one which best describes the organisation you are representing in your response.)

- Business representative organisation or trade body
- Producer of electrical and electronic equipment
- Business end user of electrical or electronic equipment
- Public end user of electrical or electronic equipment (for example, NHS, educational institution)
- Distributor (including online marketplaces)
- Local government
- Community group
- Non-governmental organisation
- Charity or social enterprise
- Consultancy
- Academic or research
- Individual
- Other
- If you answered 'Other', please provide details:

Background

The EU RoHS Directive limits the use of specified hazardous substances in the manufacture of certain electrical and electronic products. The UK played a key role in developing the original European legislation, and the RoHS Regulations transposed the EU RoHS Directive into UK law. The RoHS Regulations limits the use of 10 substances and maximum concentration values tolerated by weight in homogeneous materials as follows:

- lead (0.1%)
- mercury (0.1%)
- cadmium (0.01%)
- hexavalent chromium (0.1%)
- polybrominated biphenyls (0.1%)
- polybrominated diphenyl ethers (0.1%)
- bis(2-ethylhexyl) phthalate (0.1 %)
- butyl benzyl phthalate (0.1%)
- dibutyl phthalate (0.1%)
- diisobutyl phthalate (0.1 %)

The scope of the RoHS Regulations is wide ranging, covering most types of electrical and electronic equipment intended for household or commercial use. A limited list of products is

exempt, such as large-scale fixed installations, large-scale industrial tools, military equipment, items designed specifically for research and development, most forms of transport and active implant devices.

Businesses can apply for exemptions that allow the manufacture and supply of products that exceed these threshold limits where it can be proven that alternative less hazardous substances are not available or not reliable or the total environmental, health and safety impacts of the substitution would outweigh the benefits thereof. Following the UK withdrawal from the EU, the Secretary of State now has the power to determine applications for exemptions for products supplied to or in Great Britain. Businesses can apply to the Secretary of State for new exemptions and renewal of existing exemptions. A list of existing exemptions can be found in [Table 1, Schedule A2, of the Hazardous Substances and Packaging \(Legislative Functions and Amendment\) \(EU Exit\) Regulations 2020](#).

Under Regulation 5, an exemption may only be granted where the following conditions are satisfied:

1. The exemption does not weaken the environmental or health protection afforded by UK REACH
2. The elimination or substitution of the material or component, via design changes or use of materials or components which do not include any restricted substances, is scientifically or technically impracticable.
3. The reliability of substitute materials or components is not ensured
4. The total negative environmental, health and consumer safety impacts caused by substitution of another material or component is likely to outweigh the total environmental, health and consumer safety benefits of that substitution

The exemption request

Entry 56 in [Table 1, Schedule A2](#) of the 2020 Regulations is for the exemption for the use of '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, installed in equipment used at fixed positions while in operation which is designed for professionals, but also used by non-professional users'. Equipment typically covered by this exemption includes fluid pumps and generator sets.

The current exemption for category 11, which covers all other electronic and electrical equipment not covered under the other categories, expired on 21 July 2024, although the exemption remains valid until the renewal application has been determined. The applicant, EUROMOT, has requested a renewal for 2.5 years until January 2027.

The applicant has estimated that granting the renewal of this exemption would lead to the continued introduction of 0.123kg of lead to the GB market annually. The applicant states

that lead-free alternatives have been identified and qualified to for use in sensors and actuators of combustion engines. They have requested a renewal of the exemption to allow more time for testing and qualification of a lead-free alternative to lead solder in engine control units.

Proposed change to exemption wording

The applicant has proposed to update the existing exemption wording to the following: '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'.

The proposed wording narrows the exemption by removing reference to sensors and actuators where the applicant has stated there is now a lead-free alternative. The proposed wording also removes reference to Regulation (EU) 2016/1628².

Details on the exemption application

Lead is used within solder to create electrical connections in engine control units (ECUs). ECUs are used to control systems within internal combustion engines, such as fuel injection and ignition, and ensure optimal performance. Although lead-free solder is used in other areas of electronics, the equipment using this exemption operates under harsh conditions such as extreme temperatures, exposure to dirt and dust, high vibrations and shock and with an expected life span of decades. Lead solder has proven to be able to withstand these conditions and other properties of lead including low melting point and high thermal conductivity, allow the solder to be applied without damaging the components on the circuit board. The presence of lead also prevents the formation of whiskers in the tin alloy solder which can result in short circuits.

New ECUs are being designed with lead-free solder. However, the applicant claims that replacement of existing ECUs is not possible without extensive testing, circuit redesign or component substitution. The type of testing required varies between each manufacturer and is dependent on the application and type of engine. The applicant is requesting renewal of the exemption to allow manufacturers more time to conduct their individual testing regimes. Equipment impacted by this exemption is used in the construction, agricultural and forestry industry.

² Requirements relating to gaseous and particulate pollutant emission limits and type approval for internal combustion engines for non-road mobile machinery

Alternatives and substitutes testing

ECUs are frequently mounted on the engine block and must be able to withstand the harsh conditions of the equipment use including, thermal cycling from -40°C up to 150°C, vibration up to 12g, shock, humidity, and other corrosive conditions. Lead-free solder has been developed and is in use in other industries and new to market ECUs are designed with lead-free solder. However, ECU replacement within existing equipment requires extensive testing to ensure the alternative will last the expected life cycle and can withstand the in-service conditions. A tin, silver and copper (SAC) solder alloy was developed for consumer electronics but was found to have inadequate thermal fatigue performance. A novel alloy, Innolot, containing tin, silver copper, nickel, bismuth and antimony has been developed for automotive applications. Studies have been conducted to test the effectiveness of this lead-free alternative with mixed results compared to the performance of the existing tin-lead alloy.

This consultation seeks views on the current position regarding alternatives and substitutes, at a substance and a device level, and any limitations that the alternatives currently available might have for end users.

Socio-economic impacts

This consultation is also looking to further understand how the granting or otherwise of this exemption request may have an impact on business, from manufacturing through to end user applications, as well as wider society and social impacts (for example, human health impacts). We welcome opinions and supporting evidence for any viewpoints associated with the socio-economic impacts of this exemption.

Consultation specific questions

Q5. Do you agree or disagree that the exemption under Entry 56 in Table 1, Schedule A2 of RoHS described in the previous section should be renewed?

Agree

Disagree

Don't know

Provide evidence to support your answer, explaining why you either support the applicant's request or object to it. To support your views, provide detailed technical argumentation or evidence where possible.

Q6. Do you agree or disagree with the proposed length of the exemption renewal to January 2027?

Agree

Disagree

Don't know

Provide evidence to support your answer, explaining why you either support the applicant's request or object to it. To support your views, provide detailed technical argumentation or evidence where possible.

Q7. Do you agree or disagree that the wording of the exemption should be changed? Please note that if the wording is changed, the scope of the exemption would be much narrower.

Existing wording

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, installed in equipment used at fixed positions while in operation which is designed for professionals, but also used by non-professional users.

Proposed wording

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.

Agree

Disagree

Don't know

Provide evidence to support your answer, explaining why you either support the applicant's request or object to it. To support your views, provide detailed technical argumentation or evidence where possible.

Q8. Do you know of alternative materials for use in solder in legacy engine control units of combustion engines?

Yes, I do know of alternative materials which do not rely on RoHS-restricted substances.

No, I do not know of alternative materials which do not rely on RoHS-restricted substances.

Provide evidence to support your answer and if possible, links to supporting information on alternative materials and any limitations of those alternatives.

Q9. Are you aware of any research initiatives (past, present or planned) which are looking into possible alternatives of lead solder in legacy engine control units of combustion engines?

Yes, I do know of research initiatives which will help in the eventual production of RoHS compliant devices.

No, I do not know of research initiatives which will help in the eventual production of RoHS compliant devices.

Provide evidence to support your answer and if possible, links to supporting information. If you answered yes, provide an estimate of the time required until the technology will be available for use in the market.

Q10. Summarise your view on the potential impacts on the environment, if this exemption was or was not granted.

Provide quantitative data to support your view.

Q11. As part of the evaluation, socio-economic impacts will also be assessed. Please estimate possible positive or negative impacts on employment in total, in and outside Great Britain Great Britain, should the exemption be granted or not granted. Select the main sectors in which possible impacts are expected:

- manufacturers
- supply chain (for example, distribution)
- distributors or retailers (selling devices)
- end users
- other (provide more information)

Provide quantitative data to support your view.

Q12. Estimate additional costs or benefits associated with a forced substitution should the exemption not be granted, and how this is divided between various sectors:

- manufacturers
- supply chain (for example, distribution)
- distributors or retailers (selling devices)
- end users
- other (provide more information)

Provide quantitative data to support your view.

Q13. Summarise your view on the potential impacts on human health, if this exemption was or was not granted.

Provide quantitative data to support your view.

Q14. Provide any further information and/or data that you think is important to substantiate your views.