Consultation Questionnaire
Annex IV, Exemption 1(a)

"Lead and cadmium in ion selective electrodes including glass of pH electrodes"

Abbreviations and Definitions

Cd	Cadmium
EEE	Electrical and Electronic Equipment
RoHS	Directive 2011/65/EU on the Restriction of Hazardous Substances in Electrical and Electronic Equipment
Pb	Lead

Background

The Oeko-Institut and Fraunhofer IZM have been appointed by the European Commission, within a framework contract[1], for the evaluation of applications for exemption from Directive 2011/65/EU (RoHS), to be listed in Annexes III and IV of the Directive.

We welcome your contributions to the stakeholder consultation. Please read the history of the exemption and the applicant's justification for the revocation request, and kindly answer the related questions until 24 July 2026.

Additional information supporting this request can be found on the request webpage of the stakeholder consultation (https://rohs.exemptions.oeko.info/exemption-consultations/2026-consultation-1).

History of the exemption

Exemption IV-1(a) was listed in Annex IV with the current wording when the RoHS Directive 2011/65/EU was officially published. It was reviewed in 2020/2021 by Deubzer et al. (2022). The consultants recommended the renewal of the exemption:

[1] The contract is implemented through Framework Contract No. ENV.B.3/FRA/2023/0012, led by Ramboll Deutschland GmbH.

	Exemption	Scope and dates of applicability
1(a)	*Lead and cadmium in ion selective electrodes including glass of pH electrodes*	*Expires on* - *21 July 2021 for cat. 8 other than in vitro diagnostic medical devices* - *21 July 2023 for cat. 8 in vitro diagnostic medical devices*
1(a)-I	*Lead in the stem glass of pH glass electrodes and ion selective electrodes equipped with a pH glass electrode with complex shape as following:* - *Micro type pH glass electrode* *Composite electrode that has a spherical or tube-shaped pH responsive glass membrane with a diameter of 4.0 mm or less and a reference electrode with a liquid junction at a position vertically within 6.5 mm from the tip;* - *Flat type pH glass electrode* *pH glass electrode with a flat pH response membrane at the tip of a glass tube with a diameter of 6.0 mm or more;* - *Needle type pH glass electrode* *Composite electrode that has a conical pH response membrane with a tip angle of 40 ° or less and with a diameter of 10 mm or more."*	*Expires on 21 July 2025 for cat. 9 monitoring and control instruments including industrial monitoring and control instruments.*

Source: Deubzer et al. (2022)

An amended wording was recommended, and substitution or elimination of lead were found to be scientifically and technically practicable in 2025. The COM has not yet officially published the decision as to the renewal of exemption IV-1(a).

1.1 Applicant's justification for the requested exemption revocation

(Arradiance 2025) request the revocation of exemption IV-1. They argue that lead is traditionally used in microchannel plate and capillary plate amplifiers of electromagnetic radiation to provide the surface necessary for the secondary electron emission properties critical for the production of the signal gain.

Atomic layer deposition (ALD) was initially developed to increase the gain and lifetime of microchannel plates (MCPs) used in Military/Defense applications and the field of High-Energy Physics. Nowadays, the adoption of the technology has spread to other applications and markets.

Using atomic layer deposition (ALD), unrestricted coatings can be applied to unleaded glass such that these specially layered coatings provide the surface that can provide the secondary electron emission properties without the use of restricted materials. Specifically, the application of the ALD coating can improve the performance of the devices while leaving other physical and electrical properties largely unchanged.

(Arradiance 2025) provide in their revocation request links to several literature and other sources to substantiate their claim. These links provide information on MCPs, capillary plates, CEMs, reflectron lenses, and drift tubes. Upon request prior to the stakeholder consultation, the applicant did not

provide information on the successful use of ALD inion-selective electrodes, or of MCPs, capillary plates, reflectron lenses or drift tubes to replace the function of ion-selective electrodes.

1.2 Questions

Before you start, please fill in your contact details:

Name:

Company:

E-Mail and phone number:

1) Do you support the applicant's request to revoke the current exemption IV-1 and/or the recommended exemption IV-1(I)?

   Please substantiate your statement with technical details as to the availability of alternatives that do not contain Cd, Hg, Pb or any other restricted substances.

Please send your answers to the project email: rohs.exemptions@oeko.de at the latest by 24 July 2026.

Your answers shall be posted on the RoHS Evaluations website as part of the online consultation. In case parts of your answers are confidential, please provide your answers in two versions (public /confidential). Please also note, however, that requested exemptions cannot be granted based on confidential information!

2 Bibliography

Baron, Y., Blepp, M., Gensch. C. and Deubzer, O. (2019), Study to assess socio-economic impact of substitution of certain mercury-based lamps currently benefitting of RoHS 2 exemptions in Annex III - Under the Framework Contract: Assistance to the Commission on technical, socio-economic and cost-benefit assessments related to the implementation and further development of EU waste legislation - Final Version, available under: https://rohs.exemptions.oeko.info/fileadmin/user_upload/RoHS_Pack_9/RoHS-Pack_9_Part_LAMPS_06-2016.pdf last viewed 20.4.2026

EU (2025), RoHS Directive consolidated version from 01.01.2025, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02011L0065-20250101#anx_III, last viewed 20.4.2026

3 References

Arradiance (2025): Application for revocation of exemptions to RoHS 2. Submitted by Michael Trotter, Chief Executive Officer, Arradiance, on 22 June 2025.

Deubzer et al. (2022): Study to assess requests for renewal of 16 exemptions to Annex IV of Directive 2011/65/EU (Pack 21). Under the Framework Contract: Assistance to the Commission on technical, socio-economic and cost-benefit assessments related to the implementation and further development of EU waste legislation. Amended Final Report. in cooperation with Dr. Deubzer, Otmar, Fraunhofer IZM und UNITAR, Saskia Huber, Jana Rückschloss, Fraunhofer IZM, UNITAR Christian Clemm and Bio I. S. Shailendra MudgalDeubzer et al.Dr. Deubzer, Otmar, Fraunhofer IZM und UNITAR; Saskia Huber, Jana Rückschloss, Fraunhofer IZM; UNITAR Christian Clemm; Bio I. S. Shailendra Mudgalhttps://op.europa.eu/en/publication-detail/-/publication/f46d5d27-2d8d-11ed-975d-01aa75ed71a1Study to assess requests for renewal of 16 exemptions to Annex IV of Directive 2011/65/EU (Pack 21)18 August 2022Deubzer et al.18 August 2022Dr. Deubzer, Otmar, Fraunhofer IZM und UNITAR; Saskia Huber, Jana Rückschloss, Fraunhofer IZM; UNITAR Christian Clemm; Bio I. S. Shailendra MudgalRoHS 26, Pack 21https://op.europa.eu/en/publication-detail/-/publication/f46d5d27-2d8d-11ed-975d-01aa75ed71a1. Hg. v. Publications Office of the European Union. European Commission (RoHS 26, Pack 21). Retrieved fromhttps://op.europa.eu/en/publication-detail/-/publication/f46d5d27-2d8d-11ed-975d-01aa75ed71a1.