European
Semiconductor
Industry
Association

European Semiconductor Industry supports renewal of RoHS 4(f) exemption

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ESIA would like to thank BIO IS and the consortium team for the opportunity to input to this RoHS stakeholder consultation on the exemption evaluation. ESIA strongly supports the renewal dossier submission of January 2020 of Lighting Europe on behalf of *RoHS Umbrella Industry Project* for exemption 4(f) and their response to this consultation of February 2021 and to continue to apply the exemption with the existing wording.

The European semiconductor manufacturing industry relies on 4(f), special purpose mercury lamps and any prohibition against their use would have far reaching effects as many sectors and technologies depend upon semiconductors. If the 4(f) lamps exemption is not renewed and these special purpose lamps were no longer allowed, it would put continued European semiconductor manufacturing at risk, with no direct corresponding benefit to the environment accruing from amending 4(f).

In what applications do you use lamps in the scope of 4(f)?

4(f) lamps are used in industrial settings for the semiconductor manufacturing process.

What is your experience with alternative technologies?

No alternative is available for those specific 4(f) lamps in the semiconductor industry and therefore no experience with alternative technology is available.

Why are these lamps still required for your sector/machines/equipment?

4(f) Mercury containing lamps are used in specific semiconductor manufacturing equipment for the photolithography manufacturing process for the critical functionality and unique properties they provide. Currently, there are no alternatives available, which are capable to provide the same effective performance.

Mercury lamps are essential for semiconductor manufacturing in the EU in i-line lithography (or photolithography) and UV curing equipment tools. I-line lithography is used for structures

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and steppers using mercury discharge lamps as the light source, as they are the only available equipment and state of the art in the semiconductor industry.

4(f) Mercury containing lamps are also used in ozone detection systems in Sub Atmosphere Chemical Vapor Depostion (SACVD) process equipment to measure ozone concentrations.

These lamps are closed systems, so there is no release of mercury to the environment, and they can be properly recycled at end-of-life.

Specialty UV bulbs containing mercury are critical for semiconductors, in relation to the process of photostabilization. Photostabilization ensures optimum resist stability and critical dimension (CD) control through etch and implant sequences and is a key enabler of improved semiconductor quality.

Mercury lamps can also be used in speciality test microscope that help ensure semiconductor product quality.

What are the consequences of a ban of these lamps for your sector/company (e.g., socio-economic)?

If 4(f) lamps are banned and were no longer allowed, it would put EU based semiconductor manufacturing at risk with fab closures and high skilled employment loss. In the case of the semiconductor use, not renewing the exemption would also undermine the European Union's clear commitment to reinforce the EU's semiconductor manufacturing capacity. In March 2021, the European Commission President responding to European Council of Member states call for action proposed a 'Digital Compass' goal that by 2030, the production of semiconductors in Europe should be 20% of world production. Without the possibility to continue the use of these special purpose lamps containing mercury, this goal cannot be achieved.

If 4(f) lamps were no longer allowed due to exemption non-renewal, many uses would cease. Semiconductors play a key role in the drive for increased sustainability and energy efficiency in European society, including in efficient lighting, buildings, electric vehicles, and smart grids. From communications to computing, health care, defense, transportation, and clean energy – all these sectors use applications that are dependent upon semiconductors.

ABOUT ESIA

The European Semiconductor Industry Association (ESIA) is the voice of the semiconductor industry in Europe. Its mission is to represent and promote the common interests of the Europe-based semiconductor industry towards the European institutions and stakeholders in order to ensure a sustainable business environment and foster its global competitiveness. As a provider of key enabling technologies, the industry creates innovative solutions for industrial development, contributing to economic growth and responding to major societal challenges. Being ranked as the most R&D-intensive sector by the European Commission, the European semiconductor ecosystem supports approx. 200.000 jobs directly and up to 1.000.000 induced jobs in systems, applications and services in Europe. Overall, micro- and nano-electronics enable the generation of at least 10% of GDP in Europe and the world.