



EU consultation on the continued use of Mercury containing lamps

Halma's UV Group of Companies – Hanovia Ltd, Berson BV, Aquionics Inc and Orca GmbH

Our Group of companies, owned by Halma PLC, are global players in the UV Sector manufacturing both lamps and systems for Water, Air and Surface disinfection applications.

- Hanovia Ltd was originally established as the British Hanovia Quartz Lamp Company in 1924 in Slough, UK. Hanovia has been at the forefront in development of UV technology since its inception, from the core lamp technology through to the complete disinfection systems.
- Berson BV in the Netherlands has been serving the European Water sector since 1985,
- Aquionics Inc. serving the Americas since 1980 and
- Orca GmbH in Germany, a recent addition to our team.

Our purpose is to “Protect the world from harmful contamination without using chemicals” particularly in water, food and air where chemical use is difficult as it leaves a residual which can affect taste and smell and ultimately the health of the consumer.

Historically the water sector has been the main beneficiary of our technology, displacing Chlorine due to its inherent toxicity, harmful biproducts and danger in storage, particularly in gaseous form.

The food industry too has been a major adopter of UV technology where the ability to disinfect without leaving a chemical residual is obvious. We count many of the world's top food and beverage brands amongst our customers.

In recent times with the advent of COVID, the use of UV has become one of the technologies of choice to battle against contamination through HVAC systems in buildings. Recognised as one of the most effective disinfection techniques, with minimal pressure drop, it is easy to retrofit into existing installation alongside existing filtration, without increasing fan sizes.

With close to 50,000 UV systems operating world-wide, our reputation is based upon the reliability of the systems we produce with many still in operation more than 20 years after their installation.

We are but one of many UV companies, but what makes us unique is that we manufacture our own UV lamps and the systems they go into. This allows us to optimise the system for the application, from the lamp technology through to mechanical and electrical engineering, to ensure that the products fit, form and function is optimum for its intended use. Most other companies are either Lamp manufacturers or System manufacturers. Our vertical integration allows direct line of sight between the lamp technology and its application.

This is particularly relevant to the issue of mercury in lamps as we can see past the lamp to its use and the impact it has on the industries that we support.

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With such a deep installed base, the impact of a ban on mercury use on the water and food industries would be very significant. Having to revert to chemical or thermal means of disinfection would be a big and expensive step backwards for them and in our fight against bacterial and viral infection. Reverting to chemicals would also have further negative impact due to toxicity, harmful biproducts and danger in storage.

We recognised this some years ago, as a company devoted to environmental technology, we invested alongside the EU in our Horizon 2020 project ECO UV to commercialise a mercury free lamp. Working with DVGW, Karlsruhe Institute of Technology and the Swedish Institute of Environmental Studies (IVL) we made progress. The technology is patented but it is still far from commercially viable as efficiencies are too low at the moment. We demonstrated just how difficult it is to produce a good alternative to mercury and how long it takes to make progress, having started our work 10 years ago. We are committed to further investment but there is by no means a guarantee that we will successfully commercialise the technology.

It is therefore our belief that the industry and its users need dispensation under the ROHS regulation to allow the continued use of mercury as currently no effective substitute exists.

The damage, not just to our industry in terms of jobs lost, but to our users in the water and food sectors in terms of the cost of replacement of existing installations is beyond our ability to calculate. However, we believe it to be significant enough to warrant the continued use of mercury which in our case runs to no more than 2497g per annum.

As further background:

Our company employs 130 people. Our main manufacturing base is in Slough (UK) where we manufacture both lamps and systems, we also have system assembly in Shanghai and Germany.

We believe in being close to our customers so that we can provide local service. To support this we have Sales and Service hubs in Shanghai for Asia, Charlotte for the USA, and Eindhoven and Cologne for Europe, Middle East, and Africa.

Our UV lamp capability includes design, prototyping, testing, measuring and production of lamps. We currently have full scale production of Amalgam UV lamps from 80W to 500W and medium pressure polychromatic lamps from 0.5kW to 7.5kW.

We have lamp testing facilities including spectral output measurement and lamp life testing.

As a systems manufacturer we also have expertise in power supplies, controls, and software development.

We refer you to: www.weuvcare.com for further information about our company.

Halma

Halma is our parent company a FTSE 100 company based in Amersham, Buckinghamshire.

www.halma.com

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Halma is a global group of life-saving technology companies. Named one of Britain's Most Admired Companies in 2019, we provide innovative solutions to many of the key problems facing the world today.

Halma's purpose is to grow a safer, cleaner, healthier future for everyone every day

Halma owns over 50 companies operating in the areas below:

- Safety
- Environment and Analysis
- Medical

Our UV Group fits with the Environmental sector.

Our response to your questionnaire follows:

1. QUESTIONIARE

1. VDMA and LightingEurope² requested the renewal of the above exemption for the maximum validity periods with the same scope and wording for all EEE of cat. 3 and 5 (VDMA) and cat. 1-10 (LEU).

- a) Please let us know whether you support or disagree with the wording, scope, and re-requested duration of the exemption. To support your views, please provide detailed technical argumentation / evidence in line with the criteria 4 in Art. 5(1)(a).

The wording should be maintained, and the extension requested at least until 2026 and beyond. The reason is that the alternatives to Mercury for an environmentally friendly approach to disinfect water, air and surfaces without chemicals are still only available on very specific applications and not yet useable for large scale disinfection.

- b) If applicable, please suggest an alternative wording and duration and explain your proposal.

A shortening of the period of validity does not make sense from the industry's point of view, since the development of alternatives at suitable power levels requires a lot of time and especially the development in the UVC sector still faces great challenges. It can also be assumed that not all specific UV applications are known. The current wording of the exemption: "Mercury in other discharge lamps for special purposes not specifically mentioned in this Annex" should therefore be retained unchanged.

Commercial water treatment systems for municipal and drinking water using mercury-containing UV lamps are still the most efficient and environmentally friendly solution for disinfection because it displaces Chlorine use and is effective against Chlorine resistant organisms such as Cryptosporidium and Giardia.

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2. Please provide information concerning possible substitutes or elimination possibilities at present or in the future so that the requested exemption could be restricted or revoked.
- a) Please explain substitution and elimination possibilities and for which part of the applications in the scope of the requested exemption they are relevant.

For UV disinfection (water/air/surfaces), there is currently no chemical-free substitute with the same cost efficiency, or one that offers a practical solution to deliver the UV dose required in our markets. (see table below of our assessment of suitable UVC light sources). Markets concerned include general (drinking) water treatment plant, beverage industry (filling plants for bottles and other containers), food industry (sterilization and packaging), fish farming, pharmaceuticals, healthcare, semiconductor industry and ballast water treatment in ships, etc.

Our assessment of state-of-the-art available UVC light source for disinfection:

	Contain Mercury		Mercury free	
	Low pressure	Medium pressure	Excimer	UVC LED
<i>Efficiency [%]</i>	25 – 40	10 – 20	1 – 5	1 – 3.5
<i>Power density [W/cm]</i>	0.5 – 2	5 - 200	0.5 - 5	0.5 – 2
<i>Power per lamp [W]</i>	15 - 1000	200 - 40000	15 - 1000	0.05 - 0.2

Replacement by chemical disinfection would be a big step backwards for many sectors as the alternatives such as Chlorine or Ozone pose significant problems in terms of human safety, long term health impacts from residuals such as Tri Halo Methanes (THMs) from Chlorine, they can impart taste and odour to food products and their residual can be damaging to the environment. UV eliminates all these and has the added benefit that there is no bacteria or viral immunity to UV.

- b) Please provide information as to research to find alternatives that do not rely on the exemption under review (substitution or elimination), and which may cover part or all of the applications in the scope of the exemption request.

Replacing existing UV lamp systems with alternative systems poses a variety of problems including quality issues, process interruptions, productivity losses, high capital costs and higher overall operating costs in particular energy use and CO2 footprint

Nevertheless, we are constantly working to find alternative solutions to replace the Mercury in existing lamps. One approach is our ZEROHg UV project, a follow on from ECO UV, with the objective of bringing to market a highly innovative mercury-free ultraviolet (UV) lamp capable of purifying water for critical applications in the food & beverage and drinking water disinfection industries. We aim to commercialize a lamp and power supply by optimising the Hg-free discharge lamp

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technology and establishing a production, however efficiencies are still too low and there is no guarantee of success.

- c) Please provide a roadmap of such on-going substitution/elimination and research (phases that are to be carried out), detailing the current status as well as the estimated time needed for further stages.

*It is too early to give a timeline as the optimisation path needs to be confirmed, suffice it to say that it will take several years until the first production replacement, with no guaranteed success. There is then a long ramp up required to match the variety of lamps needed and to provide a retrofit solution. **The only thing that is definite is that this will take longer than the 5 year review period under ROHS.***

3. Do you know of other manufacturers producing devices of comparable features and performance like the ones in the scope of this exemption request that do not depend on RoHS-restricted substances, or use smaller amounts of these substances compared to the applications in the scope of this exemption?

4. As part of the evaluation, socio-economic impacts shall also be compiled and evaluated. For this purpose, if you have information on socioeconomic aspects, 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?

In 2018 Boston Consulting Group (BCG) estimated the global market just for UV disinfection equipment at \$2bn per annum exhibiting a rapid CAGR of 16%, driven by population growth, urbanisation, industrialisation, water scarcity, pollution, and a desire to move away from chemical disinfection. We know disinfection of Covid significantly increased quantities above and beyond this reported value.

- b) What are the volumes of additional waste to be generated should the requested exemption not be renewed or not be renewed for the requested duration?

Most of our equipment on the market use mercury discharge lamps and would have to be treated and disposed as waste. In many cases it is not economically and/or technologically feasible to retrofit existing equipment with alternative light sources. For our customers alone this would scrap close to 50000 systems that will have to be replaced with chemical solutions, with huge environmental impact. Loss of the technology would heavily impact critical sectors for drinking water, food and beverage and wastewater. The water sector relies heavily on UV to handle Chlorine resistant organisms such as Crypto sporidia.

- 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-requested time period? Please detail the main sectors in which possible impacts



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are expected – manufacturers of equipment in the scope of the exemption, suppliers, re-tail, users of MRI devices, etc.

Companies which use Mercury based UV technology, like ourselves, would be confronted with a professional ban resulting in a huge amount of unemployment and loss of products and productivity. A heavy EU based supply chain of manufacturing companies would be negatively impacted and, in some cases, go out of business completely.

As Mercury free alternatives are not yet technically and financially viable for disinfection applications, at the current stage, without an exemption of the further use of Mercury in or products our company would most probably need to close in consequence of the ban.

- 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).

With BCG estimating the market at \$2 billion per annum, and installed systems lasting around 10 to 20 years, the cost to both the current suppliers in loss of business, and the size of retro fit required to remove existing Mercury based UV technology is significant to say the least.



John Ryan
Managing Director