# Exemption request

- **No. of exemption:** Annex III 4(f)-I Mercury in other discharge lamps for special purposes
- **Type of request:** Amendment

## Summary of the exemption request

We believe that discharge lamps for special purposes do not meet any of the 3 exemption criteria set in 5(1)(a) for the following EEE Categories:

- EEE Category 1. Large household appliances
- EEE Category 2. Small household appliances

In these EEE categories, substitutes are practical, reliable, and readily available.

We believe that market inertia is the main reason why Mercury UV lamps may persist in household appliances.

We welcome adding “Germicidal UV discharge Lamps (GUV)” as a new subdivision to 4(f).

Mercury-free GUV technologies, like UV-C LED, have become a catalyzer for innovation, particularly in the water industry. The increasing number of start-ups focused on UV-C LED technologies, evidences the socio-economic advantages of substitutes.

# Environmental assessment of UV-C LED as a substitute technology

- LCA Available.
- LCA methodology: https://www.asahi-kasei.com/sustainability/environment/eco_products/
- Impact on climate change (see page 28 for UV-C LED): https://www.asahi-kasei.com/sustainability/environment/climate_change/pdf/climate_change_01.pdf

# Technical description of the legacy and substitute.

## EEE Category 1 — Large household appliances

Below, we describe the different product types encompassed by EEE Category 1, relevant to this exemption.

### *Point-of-Entry household water disinfection systems (PoE)*

*Background:*

- An estimated ≈ 2M households across Europe use private wells for drinking water supply, the major regions being the Nordics [2], Baltics, and Ireland [3].
- Private well-water supply often relies on domestic GUV disinfection, either with GUV Discharge Lamps, or UV-C LED (Mercury free).
- We understand that PoE UV Disinfection systems, marketed for residential use, installed at the point of entry of the household, fall into EEE Cat 1. (Same EEE Cat. as a *Water Softener*).

*Technical description*

- PoE systems typically treat 1–2 $m^3/h$ of water, 1-2 hours per day.
- GUV discharge lamp systems typically use 1x UV Lamp < 50W per system. The GUV lamp is typically ON for 12 - 24 hours per day, because frequent ON/OFF cycles significant degrade Lamp lifetime. UV-C LED systems, on the contrary, are switched ON only when water is flowing (i.e. 1-2 hours per day), leading to large energy savings.
- Lamp replacement in household GUV Mercury Lamp PoE systems is done typically every 1-2 years. With UV-C LED, lamp replacements are conducted every 3-5 years.
- UV-C LED systems are typically priced at a premium compared to GUV Lamp systems, but offer a ROI for the end user, thanks to its lower energy consumption, and less frequent lamp replacement.
- UV-C LED systems are compatible with the Drinking Water Directive.

*Environmental impact*

- In these residential systems, GUV Lamps are typically replaced by the end-user (consumer). Therefore, GUV Lamps are not traced, and recyclability can be estimated at ≈56% [1]. While each 50W GUV Lamp typically contains around 5-15 mg of Mercury, and the total weight of Mercury is relatively *small,* it's the fact that consumers manage the recyclability that worries us the most.
- As Climate Change pushes ambient temperatures upwards – increasing waterborne microbial risk particularly in summertime – we expect PoE UV-C residential water disinfection systems to become more common with users of private-well water supply.

### *Other product types within Cat. 1*

*Washing machines with UV*

- UV can used for *odour* prevention.
- Legacy Hg Lamp power consumption <6 W lamps
- Rare in household appliances, more common in professional laundry equipment.

*In-duct UV-C air disinfection units*

- Common in large buildings, but rarely used in households across Europe

## EEE Category 2 — Small household appliances

Below, we describe the different product types encompassed by EEE Category 2, relevant to this exemption.

### *Domestic water dispensers*

*Technical description*

- Domestic water dispensers are connected to the water-mains and provide water on demand.
- They sometimes  integrate GUV to maintain microbial quality of the water.
- Flow-rates are typically 1-4 Liters per minute.
- GUV Lamp water dispenser systems typically use Lamps < 12W

### *Domestic air purifiers*

*Technical description*

Mobile equipment that purify and clean air inside a household. They generally integrate multiple air-purification technologies, sometimes GUV. They are different than split or HVAC, that sometimes integrate GUV as described above (See in-duct UV-C air disinfection units)

## Other EEE Categories where substitution is possible

### *Category 10 – Automatic Dispensers.*

In this category, GUV is often integrated in professionally serviced water dispensers (no other GUV products identified on this EEE category). Most of the manufacturers have already transitioned to UV-C LED on their new designs.

Treated flow rates of water in professional water dispensers typically vary from 1-4 liters per minute. Legacy GUV lamp integrated in dispensers typically have a power consumption 8-12 W, similar to UV-C LED substitutes. While GUV Lamps are replaced yearly, UV-C LED systems typically last the entire lifetime of the water dispenser.

## Socio-economic advantages of the transition to Mercury-free UV-C LED

The transition from UV mercury lamps to UV-C LED is actively driving innovation across the Union. Numerous start-ups have emerged in recent years, that use UV-C LED as its core technology. These start-ups are catalyzing innovation in their respective industries, mostly in water technologies.

## References

[1] CENELEC

[2] 200307-matning-av-naturlig-radioaktivitet-i-dricksvatten.-test-av-matmetoder-och-resultat-av-en-pilotundersokning.pdf

[3] *"The Provision and Quality of Drinking Water in Ireland – A Report for the Year 2011". Environmental Protection Agency. 2012.*

**Table of contents**