

Affected Lamps Exemption From Licensing



epa

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

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Background

- The European Lighting Confederation held meetings with interested parties (Regulators, European Commission, IAEA Secretariats) with the objective of securing exemptions for Affected Lamps from Regulatory Control.
- A formal request was made to the RPII (EPA) by Philips on behalf of the lighting industry in Ireland and the ELC for an exemption from licensing for the *import* and *distribution* of Affected Lamps
- A working group consisting of 3 RPII (EPA) inspectors was set up to consider this matter further.
- **The main objective of this working group was to see if there is a basis in Irish legislation to exempt Affected Lamps from Regulatory Control.**

■ Radiological Protection Act, 1991 (Ionising Radiation) Order, 2000

Lamp Description

■ Affected Lamps use small amount of radioactive substances (Kr-85, Th-232, H-3) :

- For their physical properties (to optimize light spectrum),
- To provide a starter aid function
- To improve electrodes metallurgical properties (Thorium) to increase the stability of the electric arc between electrodes

Uses of Affected Lamps

■ Applications :

- Metal halide high wattage: outdoor (stadium, streets, public buildings etc.)



- Metal halide low wattage : indoor (shops)
- Xenon head car lights
- Movies, theatre or industrial processes



- Not designed for use in domestic environments



Benefits of Affected Lamps

- Affected lamps are very energy efficient resulting in significant reductions in CO2 emissions
- Produce light with a high intensity suitable for non domestic environments
- Affected lamps last for considerably longer than conventional lamp technologies

Details of Affected Lamps sold in Ireland per year

Type of lamp	Typical Application	Radionuclide	Typical activity per product (Bq)	Max Activity per product (Bq)	Exemption Value Quantity (Bq)	No of lamps sold in 2013 in Ireland
Mercury short arc lamp	Fluorescence Microscopy, Endoscopy	Th-232	50 - 500	< 1000	1000	0
Xenon short arc lamp	Film Projection, Architecture Lighting	Th-232	50 - 500	< 1000	1000	0
Automotive Xenon	Car Headlight	Th-232	0.2 – 0.5	< 0.5	1000	296
Metal halide lamps or arc tubes	Shop, Hotel and Restaurant Lighting Office Lighting Stadium Lighting	Th-232	1 - 100	100	1000	0
Metal halide lamps or arc tubes	Shop, Hotel and Restaurant Lighting Office Lighting. Stadium Lighting	Kr-85	100 - 2500	< 10,000	10,000	20183
Entertainment short arc lamps	TV Studio and Stage Lighting	Kr-85	1500 - 9500	< 10,000	10,000	0
Induction lamps	High Bay Indoor and Outdoor applications	Kr-85	1000 - 5000	5000	10,000	No data
Compact fluorescent lamps containing glow switches	Fluorescent tube lamp system	H-3	100-500	1000	10 ⁹	28,482*
Starters Glow Switches	Fluorescent tube lamp system	H-3	100-500	1000	10 ⁹	79,500*

Some facts on Affected lamps in Ireland

- The total activity in Affected lamps imported into Ireland each year is approximately 1.2 MBq
- The quantity per shipment is approximately 60 kBq
- There are approximately 100 distributors of Affected lamps in Ireland, however each distributor would hold only small amounts of affected lamps at any one time (3500 Bq)
- There is only one facility that recycles Affected lamps in Ireland. Approximately 1 tonne of affected lamps are recycled annually

Initial Findings

- Th-232 is used for its metallurgical properties and not for its radioactive, fissile or fertile properties. In accordance with Article 3(1) of SI 125, **Th-232 does not come under the scope of SI 125 of 2000.**
- H-3 and Kr-85 are used for their radioactive properties and are therefore licensable under SI 125.
 - However high exemption value 10^9 Bq for H-3 and relative small no of H-3 lamps sold means exemption value will never be exceeded for H-3
 - **Hence only affected lamps containing Kr-85 were considered further**
- Affected Lamps fall within the definition of **sealed sources** in SI 125 and the provisions of the SI in relation to sealed sources were reviewed

Basis for review of SI 125 of 2000

- In this working group the provisions of SI 125 of 2000 were reviewed:
 - to see if there is any legal basis for the granting of an exemption from licensing for practices that involve Affected Lamps that contain Kr-85, which are deemed to be **sealed sources**, in which the inventories of radioactive substances exceed the exemption value listed in SI 125 of 2000,
 - Affected lamps not consumer products – Legal Advice.

Basis for exemption from Licensing

- Individual lamps are below exemption values in SI 125 of 2000, however larger quantities of lamps would be above these values
- Article 5(1a) of SI 125 of 2000 allows the EPA to set higher exemption values than those given in Annex 1 of SI 125 of 2000 provided the basic criteria for exemption detailed below are met.
 - The effective dose to be incurred to any member of the public due to the exempted practice is of the order of 10 μ Sv per year, and
 - Either the collective effective dose committed during one year of performance of the practice is no more than about 1 man Sv or an assessment of the optimisation or protection shows that exemption is the optimum option.

Evidence that basic criteria is met (Main reports)

- IAEA, 2012. **Exemption from Regulatory Control of Goods Containing Small Amounts of Radioactive Material.** IAEA TECHDOC 1679.
- HPA, 2011. **Assessment of the Radiological Impact of the Recycling and Disposal of Light Bulbs Containing Tritium, Krypton-85 and Radioisotopes of Thorium.** HPA-CRCE-021, Health Protection Agency, Centre for Radiation, Chemical and Environmental Hazards, Chilton, Didcot, Oxfordshire OX11 0QR.
- HPA, 2010. **Assessment of the Radiological Impact of the Transport and Disposal of Light Bulbs Containing Tritium, Krypton-85 and Radioisotopes of Thorium.** HPA-CRCE-008, Health Protection Agency, Centre for Radiation, Chemical and Environmental Hazards, Chilton, Didcot, Oxfordshire OX11 0QR.

Evidence that basic criteria is met with increased exemption values

- In all studies, the basic criteria for exemption was met for all practices involving affected lamps. These studies involved large quantities of lamps.
 - **Largest individual effective of 7.2 uSv was received by a truck driver transporting 20 pallets of lamps containing 360 MBq of Kr-85 for 400 hrs per year**
- IAEA report concluded that “exposure risk for any member of the public is far below 10 uSv per year and that this study supports the idea that Affected Lamps containing Kr-85 and Th-232 can be made available to a global market without restrictions”.
- UK has set an exemption value for Affected Lamps containing Kr-85 of 200 MBq, the assumption being that the basic criteria for exemption will be met for this value.

Main Findings (1)

- Affected Lamps containing Th-232 fall outside the remit of the licensing provisions of SI 125 of 2000. This arises since Th-232 is not used for its radioactive, fissile or fertile properties.
- Affected Lamps containing H-3 are exempt from licensing under the provisions of SI 125 of 2000 provided the quantities are kept below 10^6 units. This is based on the current exemption value for H-3 and the typical H-3 activity in individual Affected Lamps.

Main findings 2

- The legal basis for the granting of an exemption from licensing for practices that involve Affected Lamps containing Kr-85 is contained in Article 5(1a) of SI 125 of 2000. Under this Article, the EPA can in exceptional circumstances authorise different i.e. higher exemption values to be used in determining if any listed practice can be exempted from licensing. In these exceptional circumstances, practices can be exempted from licensing provided that the basic criteria contained in Schedule 5, Paragraph 3 of SI 125 of 2000 are met.
- International studies indicate that exemption values significantly higher than those presented in Table A of SI 125 of 2000 can be adopted and the basic criteria contained in Schedule 5, Paragraph 3 of SI 125 of 2000 will continue to be met. The UK has derived a new exemption value for Kr-85 of 2×10^8 Bq.

Main findings 3

- The adoption by the EPA of an exemption value of 2×10^8 Bq for Affected Lamps containing Kr-85 will result in the practices listed in SI 125 of 2000 in relation to transport, import, export, storage, handling, holding, use, disposal and recycling of Affected Lamps being exempt from regulatory control.

Recommendation

- The adoption of an increased exemption value for Kr-85 of 2×10^8 Bq will result in all practices with the exception of manufacture and production being exempt from regulatory control; **however**
- The granting of such an exemption is incumbent on Philips carrying out a safety/risk assessment of the radiological impact of various practices involving affected lamps in Ireland.
 - To date this has not happen
 - **In the absence of such an assessment EPA will have to consider full licensing for practices involving Affected Lamps where the quantity of Kr-85 exceeds the exemption value in SI 125 of 2000**