NEMA Q&A on Materials Used in Certain Energy Efficient Lamps

The global lamp industry, led by the European Lamp Companies Federation (ELC), is currently addressing the complex web of national and international regulations for certain lighting products which contain very small amounts of ionizing substances. These substances are harmless to health and environment, but necessary to facilitate quick and reliable starts. In fact, the extremely low level of ionizing radiation emitted means they are as safe as everyday life[1]. Despite the fact that these products are safe at any stage of their lifecycle and do not pose a risk to health or the environment, they are subject to regulations in the U.S. and in other countries.

Which lamps are at issue? Where are these lamps used?

Affected lamps are high-intensity discharge lamps such as metal halide lamps, typically used in commercial and professional applications -- public-area lighting, stadiums, manufacturing facilities, shopping centers, etc. – to provide very bright light.

Are these lamps safe?

These lamps do not pose any health risks in use, transportation or disposal. The ionizing radiation dose emitted from these lamps is well below recognized safety limits and a tiny fraction of the natural radiation that we experience in everyday life.

Recent studies in support of this statement include:

- The European Commission Report[2]
- The IAEA Draft Safety Report[3]
- The UK Health Protection Agency Report[4]

Are these lamps radioactive?

The affected lamps contain small amounts of low level radiation emitters (Krypton-85 or Thorium). A major benefit of this technology is that light of a desired spectral quality and high intensity is produced in a very energy efficient manner. Another benefit is quick and reliable starts. The use of these materials is technically necessary to achieve the above mentioned benefits.

The radiation emitted from lamp sources (0.01 millisievert per year) is far below the amount of natural background radiation experienced in everyday life.

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[1] For more information on background radiation in the environment and other sources, consult http://web.princeton.edu/sites/ehs/osradtraining/backgroundradiation/background.htm or http://www.world-nuclear.org/education/ral.htm.

[2] http://ec.europa.eu/energy/nuclear/transport/doc/final-version-study1.pdf

[3] http://www-ns.iaea.org/committees/files/RASSC/1062/CS-170DRAFT.pdf

[4] http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1287143225736

Why is the use of radiation emitters in these lamps required?

The use of these materials (Krypton-85 or Thorium) is technically necessary to achieve the required spectral quality and high intensity, in a very energy efficient manner.

What happens if these lamps break?

An independent study[5] concludes that the lamps involved are harmless to health and environment throughout their lifecycle, even in accident scenarios or under bulk conditions.

Can these lamps be safely disposed of or recycled?

Yes, an independent study[6] concludes that the lamps involved are harmless to health and environment throughout their lifecycle (including end-of-life).

Some U.S. states require these lamps to be recycled. As an industry we recommend recycling to control the amount of waste going into landfills and to promote a greener environment. See www.lamprecycle.org for more information.

How long have these lamps been produced?

These lamps are integral to our modern way of life. They have been produced and distributed in the U.S. since the 1960s.

Are these lamps regulated in the United States?

Yes, NEMA member companies and others are regulated by the Nuclear Regulatory Commission (NRC) and the Department of Transportation. To the best of our knowledge, all NEMA companies have the necessary NRC licenses and are in compliance with all applicable U.S. regulations for these products.

What radioactive materials are used?

One or two types of materials can be used depending on the lamp type and specific design:

- Krypton-85
- Natural Thorium (Containing Thorium-232)

[5] Ibid.
[6] Ibid.

Metal Halide HID Lamp

What do these lamps look like and how do they work?

In a high-intensity discharge (HID) lamp, as shown above, electricity is conducted between two electrodes, creating an intensely bright arc light. Mercury, sodium, or metal halide salts act as the light emitters. Because of the intense light they produce at a high efficacy, HID lamps are commonly used for outdoor lighting and in large indoor areas.