Waste Management Guide- Quartz Metal Halide Lamps

The following information is provided by GE Lighting as a courtesy to our customers and trade partners.

No material contained within a luminaire is released during normal use and operation

I. Product Identification

GE Quartz Metal Halide Lamps-QMH
Applicable lamp types: MVR, MVT, MPR, MXR,ARC,MBI,KRC,SPL,TU and MH

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II. Health and Safety Information

Lamp materials exposure
There are no known health concerns that result from exposure to intact lamp or to occasional exposure to broken lamps. The possibility of glass cuts is the primary hazard of broken lamps. The constituents identified below are contained within the durable inner arc tube of the lamp.

Mercury exposure
The air concentration of mercury resulting from the breakage of one or a small number of lamps should result in no significant exposure to the individual. If breaking a large number of lamps for disposal, storing broken arc tube or spent lamp, see Disposal Information in Section III and Special Handling Information for Broken Lamps in Section V.

Thallium exposure
Thallium is a cumulative poison that can be absorbed through the skin. It may give off toxic fumes if it is heated until decomposition temperature. Be careful not to crush the ceramic arc tube. If the arc tube is broken, handle in a well-ventilated area, with local exhaust ventilation. Personal protective equipment including wearing of gloves is recommended.

Nitrogen exposure
On the outer envelope of quartz metal halide lamps vacuum or small amount of nitrogen is present. Nitrogen is non-reactive, non-flammable, inert gas under normal conditions. Nitrogen is non-toxic, but it can cause breathing difficulties if it displaces the air and the oxygen content in closed place. However, nitrogen gas concentrations from the breakage of one or a small number of lamps should not result in significant exposure; the released nitrogen gas is not dangerous.
**Impact of low-level radiation - krypton-85**

The radioactive krypton 85 gas is present at a low level in argon gas located in arc tube. Argon and Kr-85 gas are chemically inert. The air concentration of krypton-85 resulting from the breakage of one or a small number of lamps should result in no significant exposure to the individual. For a CMH arc tube with Kr-85 activity level ranging 2.5-9300 Bq, the expected gamma emitter dose rate would be 7.55E-8 to 2.81E-4 µSv/h at a distance of 10.0 cm assuming no shielding from lamp or package. In the unlikely event of arc tube breakage, traces of Krypton-85 gas immediately disperse in the air. Krypton gas and its radioactive isotope are inert (they do not react chemically with other substances) and are not absorbed by the body. Breakage of the outer envelope will not result in release of Krypton-85.

**Impact of low-level radiation - thorium**

The radioactive thorium metal is combined with tungsten electrodes located in the lamp. These insignificant amounts of thorium are identified as radioactive source material. Radiation does not leave the intact arc tube. One or a small number of lamp breakage does not involve a significant risk to the individual. Thorium iodide can also be displayed in arc tube. The released thorium iodide from arc tube may cause irritation to the nose, mucous membranes and respiratory tract.

The IAEA - TECDOC\(^1\) - 1679 document declares that the effects of radiological materials in lamps to society and to the lighting industry and other employees, in connection with the lamp for the whole life cycle - including waste disposal - has been shown to be insignificant.

**Quartz and Ceramic**

Quartz in the form of fused or amorphous silica has not been identified as a carcinogen. The ceramic arc tube is made of polycrystalline alumina (PCA), a material generally considered to have a low order of toxicity.

**Barium Peroxide**

Barium peroxide is identified as one-sided copper stainless steel plate inside the envelope. The barium peroxide is extremely dangerous and oxidant if ingested. Material behaves as a potential irritant in contact with skin and eyes. Use personal protective equipment when treated with damaged or removed outer envelope.

**Lead Solder**

Lead may be present in the solder on some lamp bases. Lead is not a health hazard with intact lamps. The air concentration of lead resulting from the breakage of one or a small number of lamps should result in no significant exposure to the individual.

**III. Disposal Information**

GE Lighting recommends that all lamps containing mercury be recycled. Each arc tube of metal halide lamps contains mercury. The quartz metal halide lamps with Edison Screw base caps may use lead solder.

In European Union Member States these lamps shall be disposed and collected separately from universal waste. Lamps will be marked with the WEEE (Waste Electrical and Electronic Equipment) label in compliance with Article 14(4) of Directive 2012/19/EU and European standard EN 50419. Please refer to the provisions of local regulations to ensure compliance.

Electro-Coord Hungary Non-profit Ltd. collects lamp, fluorescent and gas discharge principle operating lamp waste in a separate return and collection systems in Hungary. The Electro-Coord Hungary Non-profit Ltd. provides a focal point for the collection of lamps, fluorescent lamps and discharge lamps, used by both public institutions and enterprises as follows:

• please place the linear fluorescent lamp waste into large ELC (adopted by European Lighting Companies Federation) metal container (container for the collection of fluorescent lamp waste between 60 and 180 cm length),
• please place other waste lamps into small ELC metal container.

The suitable waste types (metal, plastic and glass) will be recycled, the hazardous and non-recyclable waste will be disposed in environmentally friendly manner. Please take care that the lamps and lanterns are not crushed when they are placed into the selected container.

For more details, refer to the website or call the customer service office waste Affairs phone number 06-30 - 222-2229.

If breaking a large number of lamps for disposal, storing broken arc tube or spent lamp, appropriate monitoring, controls and equipment should be implemented to control airborne mercury and dust levels or surface contamination. Such work should be done in a well-ventilated area and local exhaust ventilation or personal protective equipment may be needed. Personal protective equipment is recommended, including the use of gloves as well.

IV. Transport of lamps

The quartz metal halide (QMH) lighting products contain substances that are regulated by HMT (Hazardous Materials Table) special circumstances.

Mercury

Mercury may be regulated as a hazardous material in transportation. On January 1st, 2013, the unique UN identification number for mercury contained in manufactured articles such as lamps was changed from UN2809 Class 8, to UN3506 Class 8 with a 6.1 toxic subsidiary risk. The regulatory limits for UN3506 are transportation mode specific, with the limits for air shipment being the most restrictive. Air limits are based on the amount of mercury per lamp as well as the amount of mercury per package.

Low-level radiation materials of mercury lamps

The inner arc tubes of High Intensity Discharge lamps may also contain small quantities of the low-level radiation emitting materials Krypton-85 in addition to mercury. These lamps may be HMT regulated depending on the makeup of the individually shipped consignment. Certain consignments may be classified as UN2911 excepted package, with certain packages in those consignments regulated as UN3506. Consult appropriate shipping guidance for package regulatory limits.

V. Special Handling Information for Broken Lamps

• If the arc tube is broken, ventilate the area.
• Use adequate general and local exhaust ventilation to minimize exposure levels. Open windows and doors and use fans to displace vapors
• Use appropriate respirator.
• Use appropriate safety glasses or goggles, puncture resistant gloves and protective clothing.
• Avoid generating dust during clean-up.
• Avoid mercury dust production. Do not spray water on mercury dust to avoid mercury spills. Use specially equipped mercury vacuum cleaner systems, or pipettes.
• Do not use standard vacuum cleaners during clean-up. Optionally, sweep up all particles, or using disposable gloves wipe up with a damp cloth or paper towel and place all waste in puncture resistant closed container or double-bag.
• Practice personal hygienic protocol. Wash hands thoroughly before eating, drinking, smoking, handling tobacco products, applying cosmetics, or using toilet facilities. Dispose of contaminated clothing.
• Seek competent medical assistance for any concerns or if exposures are experienced.

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