

FACT SHEET No. 24-002-0520

OPTICAL RADIATION HAZARDS AND CONTROLS FOR MERCURY VAPOR AND METAL HALIDE LAMPS

PURPOSE

Provide information on possible optical radiation hazards and control measures for mercury vapor and metal halide lamps

Potential Hazards

Mercury vapor and metal halide lamps are used for general illumination in gymnasiums, many industrial settings, and other areas. These lamps can be identified by their characteristic intense bluish or whitish emissions and ellipsoidal bulb shape with a short, cylindrical glass protrusion as shown in Figure 1.

These lamps use an outer glass envelope to block the emission of ultraviolet (UV) radiation. If the outer glass envelope breaks, and the lamp continues to operate, a UV hazard to the eyes and skin will then be present. Because UV radiation is not visible, bystanders will be unaware of the UV hazard caused by a broken bulb.

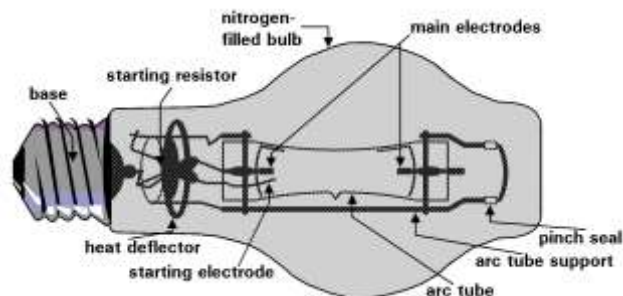


Figure 1. Ellipsoidal Bulb

Reported Injuries

UV-induced eye and skin irritation have occurred at gymnasiums during athletic events when errant balls broke the bulb's outer glass envelope. In one incident, auditorium lamps were damaged by vandalism. Incidents involved dozens or even hundreds of affected people. The injuries included photokeratitis (swelling of the cornea) and skin erythema (sunburn). These injuries are temporary but can be quite painful.

FEDERAL REGULATIONS

Title 21 Code of Federal Regulations 1040.30 requires all mercury vapor lamps intended for general illumination purposes manufactured after 1981; mercury vapor lamps must have proper labels to identify them as containing self-extinguishing or non-extinguishing bulbs. Self-extinguishing bulbs will extinguish within 15 minutes after breakage. These lamps are known as "T" type bulbs and have a letter T in a visible location. Non-extinguishing bulbs are known as "R" type bulbs.



Figure 2. Mercury Vapor Lamps

CONTROL MEASURES

- Proper installation. Only self-extinguishing bulbs should be installed in indoor areas. Non-extinguishing bulbs should be limited to outdoor use, or installed within a glass or plastic enclosed protective fixture. Wire guards do not offer sufficient protection against breakage. This is especially important for areas like gymnasiums where contact with the lamp is more likely.

- **Inspection.** Periodically inspect the lamps according to manufacturer recommendations for maintenance to ensure that protective enclosures and outer glass envelopes are intact. Always deactivate first, and use lock-out tag-out procedures. If any bulbs are broken, immediately remove them from service to prevent personnel exposure to potentially harmful UV emissions.
- **Standing Operating Procedures (SOPs).** SOPs should be developed for lamp installers, lamp maintainers, and facility managers who routinely work in the lamps' vicinity. The SOP should—
 - Identify the potential UV hazard.
 - Instruct workers that, in the event of lamp breakage:
 - deactivate the lamps immediately and move people away from the lamp area,
 - advise personnel to seek medical attention if eye or skin irritation occurs, and
 - replace the damaged bulb, and retain it for assistance with investigating and reporting the incident.
 - Provide methods to report accidents or defective equipment.

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