



HAZARD ALERT

February 2005

Metal Halide Lights

Recently, an inspection was conducted in response to employees experiencing burns to the skin and eyes after attending a training session in an elementary school gymnasium. Approximately 120 district employees attended the training session, and half of those teachers reported symptoms and/or sought medical attention.

Why the injuries occurred

The source of the injuries was the 400-watt metal-halide lamp. The protective outer jacket to the lamp was broken but the bulb's inner quartz tube continued to illuminate, and it emitted ultraviolet (UV) radiation. This radiation caused serious skin and eye inflammation.

The type of hazard produced by this lighting was not well known within Oregon school districts. The source and severity of the hazard was not recognized until after employees were exposed to the UV light emissions.

Exposures

Measurements of UV radiation levels were taken at various locations throughout the gym. Sampling of the UV light source using a similar metal-halide bulb with a broken protective envelope was performed in attempt to replicate employee exposures. UV exposures throughout the gym ranged from 0.1 microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$) in the corners of the gym, to 6.0 $\mu\text{W}/\text{cm}^2$ beneath the bare tube. At an exposure intensity of 6.0 $\mu\text{W}/\text{cm}^2$, a full-day exposure according to published guidelines of American Conference of Governmental Industrial Hygienists (ACGIH) would occur in only 8 minutes.



Measurements were also taken with intact bulbs to represent normal conditions. UV levels were within acceptable levels.

Prevention

- Education and training
- Regular inspection of lights
- Use commercially available self extinguishing bulbs
- Use an additional glass or plastic lens that fits under the light and envelop

Other Information

The 2005 National Electric Code Article 410.4(E) has newly adopted requirements for luminaries for indoor sports, mixed use and all purpose facilities. In brief, the article provides that mercury-vapor or metal-halide bulbs located in playing and spectator areas, that are subject to physical damage, must be of a type that protects the lamp with a glass or plastic lens. Open bulbs are not permitted. An additional external screen or cage used to prevent a ball from striking the bulb is permitted, but is not a substitute for the required lens.

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