Safety and health alert

15/98 Ultraviolet radiation from mercury vapour and metal halide lamps

Incident

A considerable number of persons were affected by ultraviolet radiation emitted from broken mercury vapour lamps at a public event at Katanning in April 1998.

Mercury vapour and metal halide lamps are used to illuminate sports stadiums, industrial, commercial and office buildings as well as roads, parking and public areas.

Mercury vapour and metal halide lamps are constructed as a two-jacketed device - an inner tube and an outer glass envelope. The inner tube contains the gas through which an electrical discharge is maintained. The discharge emits electromagnetic energy in the form of visible light, ultraviolet and infrared radiation. The inner tube is surrounded by a glass envelope, the inside of which is coated with a phosphor which emits a visible light. The outer envelope reduces shortwave ultraviolet radiation emitted from the inner tube. If the outer envelope is broken, the lamp will continue to burn emitting shortwave ultraviolet radiation of sufficient intensity to cause severe skin and eye burns. The fact that exposed persons may be unaware of damaged lamps makes these lamps particularly hazardous.

Factors

Ultraviolet radiation can produce severe burns to the skin and eyes of exposed persons. When skin is exposed to ultraviolet radiation, reddening can occur due to dilation of blood vessels near the skin surface. The effect can be evident for a few hours or days following exposure. It may also be accompanied by itching and discomfort. Extensive or repeated exposures to ultraviolet radiation can lead to premature "aging" or wrinkling of the skin, or skin cancer in later years.

Burns to the eyes can result from exposure to ultraviolet radiation. Photo keratitis may result and can last for several days, often causing incapacitating pain, a sandy or gritty sensation in the eyes, and an aversion to light (photophobia). Severe burns to the eyes can result in scarring of the cornea and permanent eye damage.

Recent tests conducted on mercury vapour and metal halide lamps with the outer envelope removed gave ultraviolet radiation levels that exceeded the National Health and Medical Research Council 8 hourly exposure limit within a few minutes, even at several metres distance.

Lamps are available that extinguish automatically (within 15 minutes) when the outer glass envelope is broken.

Recommendations

1. Where possible automatically extinguishing lamps should be used. Alternatively, a protective shield should be installed under the lamp. This serves the purposes of protecting the lamp from breakage, absorbing hazardous ultraviolet radiation in event

of breakage of the outer envelope and containing the glass fragments from any spontaneous breakage. Shields are available from lighting distributors.

2. Regular checks need to be made of lamps to ensure the outer envelope is not broken or punctured.
3. When a defective lamp is encountered:

    (a) leave the area immediately and alert others to leave, and
    (b) take action to rectify the situation

Lamps with defective outer envelopes can be identified by their considerably reduced brightness and a more bluish tinge in the emitted light.

Persons exposed to radiation from a mercury vapour or metal halide lamp who develop skin burns or eye irritation should seek medical assistance, ensuring they advise their doctor of their exposure to ultraviolet radiation.

Further technical information regarding the issue of ultraviolet radiation can be obtained by contacting:

(Mrs) Mary Aerts
Physicist
Radiation Health Section
Health Department of Western Australia
Ph: (08) 9346 2260
Fax: (08) 9381 1423
E-mail: radiation.health@health.wa.gov.au

Further Information

Further information can be obtained from the WorkSafe internet site www.worksafe.wa.gov.au, or by contacting customer service on 1300 307 877 or email: safety@docep.wa.gov.au.

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