

Metal Halide Lighting

Understanding the Risk

High Intensity Discharge lighting (HID) is commonly encountered internally in commercial and industrial facilities and externally for yard, street and security applications. HID lighting is both efficient in respect of intensity and cost effective in respect of lamp longevity of up to 25,000 hours use. The lighting units incorporate ballast and the bulb produces an arc between 2 electrodes which vapourises the metallic content within the tube.

HID lamps fall into 3 categories:

- Mercury vapour
- High pressure sodium
- Metal halide

On operation, the lamps create both high internal pressure and temperature. In the case of metal halide lamps, this can be up to 6 bar and over 1,000°Celsius. At the end of their life most lamps will burn out harmlessly. However, due to the high internal temperatures and pressures, catastrophic failure has been known to occur at the end of their natural life or if damaged. This is most noticeable in the case of metal halide lamps as they operate at the highest temperatures and pressures as noted above.

If a metal halide lamp fails in a catastrophic manner, the hot quartz arc tube particles dropping from the fitting can ignite combustible materials below and cause a serious fire. This is applicable for both internally located units and those used beneath external canopies or loading bays etc.

For this reason, whilst all electrical installations are subject to local legislative requirements, it is important that the risk concerning metal halide HID lighting is fully understood and adequate precautions undertaken to minimise the risk of fire starting.

Different types of lamps are manufactured for use within different types of light fittings as follows:

- **O - Type**

Shrouded tube or double containment feature designed for use in open fixtures.

- **E - Type**

For use within light fittings that are designed with integral containment barriers.

- **S - Type**

Non-shrouded lamp for use within enclosed or unenclosed fittings.

Controlling the Hazard

In view of the potential for metal halide HID lighting to be a fire inception hazard on catastrophic failure, the following precautions should be taken to reduce this risk as far as possible. These precautions are specific to metal halide HID lighting and are in addition to any local legislative requirements and maintenance regimes necessary for fixed or portable electrical installations.

- Light fittings and lamps should be used in accordance with the operating instructions supplied by the manufacturer
- Do not use any lamp that has been damaged or scratched. Physical damage may cause the lamp to rupture unexpectedly.
- Avoid water contact with the lamps as this can result in rupture due to thermal shock.
- Where possible, arrange stock layout such that the position of lamps is within aisles to minimise the risk of hot particles falling onto combustible items in the event of an uncontained failure.
- Do not use lamps in close proximity to combustible items that can cause a fire hazard.
- The lamp type and rating should be appropriate for the fixing and meet the manufacturers' specification.
- Only replace lamps with the correct type for the fitting and ensure all containment devices are in good order and replaced correctly.
- Do not modify existing fittings or retrofit non-approved containment barriers without manufacturers' input and approval otherwise correct heat dissipation may be compromised causing lamp rupture.
- Where metal halide lamps are in continuous operation, they should be turned off once per week for 15 minutes. Any defective lamps liable to fail should be picked up by this controlled procedure.
- As failure rate increases with age, it is recommended that non 'O' type metal halide lamps or those installed in uncontained light fittings are group replaced at 70% of their rated life with 'O' type lamps. Although 'O' type lamps are designed to contain hot fragments on catastrophic failure, there is still a risk and routine replacement at 100% of rated hours should be undertaken.
- Lamps should be inspected on a regular basis and any that are dim, flickering or not producing light should be replaced immediately.
- For new installations the use of light fittings with integral containment barriers (i.e. borosilicate glass) fitted with the appropriate lamp type is preferred.
- Lights should only be changed by qualified electricians.

For further information, contact your local AIG risk engineer

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