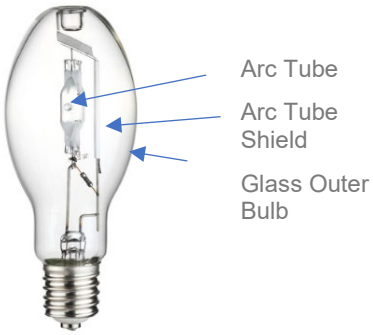
Insight: Metal Halide Lighting Risks

Recognizing the Risk

The High Intensity Discharge (HID) lighting (i.e. luminaries) commonly seen in stadiums and outdoor sports fields lighting up the night can also be found inside commercial buildings. This type of lighting is a common choice because they illuminate bright white light and are relatively cost effective. HID lamps fall into 3 basic categories: Mercury vapor, sodium vapor, and metal halide.

Metal halide (MH) HIDs pose an inherent fire risk because of the high temperature and pressures at which they operate. In the case of MH-HID lighting, this can exceed 2000 °F (1093 °C) and 90 psi (6.2 bar) . Unlike incandescent bulbs that harmlessly fail with a small flash of light, MH-HIDs can fail catastrophically “raining” sparks and hot glass bulb fragments. There have been many cases where these hot particles have landed on combustible materials below, causing a serious fire event.



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For this reason, where installed it is important that the risk concerning MH-HID lighting be fully understood and adequate precautions be taken to minimize the risk of fire. Lamp fixtures can be ordered with or without bottom lenses made of either standard plastic/glass or, a material such as high temperature borosilicate designed to withstand catastrophic lamp failure and contain sparks. There are three primary types of lamps- each manufactured for use within different types of light fittings:

Type O- Made with a shrouded arc tube or double containment outer bulb designed to contain catastrophic failure sparks for us in open fixtures.

Type E- Standard lamps for use in fixtures with integral containment barriers.

Type S- Standard lamps for use in enclosed or unenclosed fittings

Controlling the Hazard

As with most construction materials, the more robust (i.e. safer) the device the more the cost. This is also true for lamp fixtures. Protected fixtures and Type O lamps typically have the highest cost. And this can add up when looking at a warehouse that may have 1000 fixtures. This is, until the added risk of “less safe” ones is considered.

To reduce fire risks with MH HID lighting, the following precautions are recommended:

- Use only Type O lamps with compatible fixtures or Type E and S bulbs with compatible fixtures having approved spark containment lenses.
- Use only light fixtures and lamps that are compatible and installed in accordance with the operating instructions supplied by the manufacturer and installed per National Fire Protection Association (NFPA) 70, Article 410*.
- Operate and maintain lamps per manufacturer and NFPA 70, Article 410*.
- Never use damaged or scratched lamps.

- Arrange combustible materials, warehousing and storage, such that sparks and falling hot particles produced from lamp failures will not contact combustible materials below per NFPA 1*. For example, install lighting centered in aisles and not over storage.
- Where lamps are in continuous operation, cycle off once per week for 15 minutes followed by visual inspections of operation, color change, and outer bulb failure (recommended as a method to detect lamps close to their end of life with catoptric burn out potential) per NFPAS 70B.
- Monitor lamps at start-up for color change and outer bulb failure. Start-up is when some bulbs can show signs of eminent failure.
- Replace all bults that are not Type O or use approved fixtures with spark containment lenses at 70% of their rated life per NFPA 70B*.
- Immediately replace lamps that are flickering or operating at low intensity.
- Only install new lights that comply with UL 1572 and UL 1598.

References & Resources

AIG Insight: Warehouse Fires

National Fire Protection Association (NFPA) Standard NFPA 1: Fire Code

National Fire Protection Association (NFPA) Standard NFPA 70: National Electrical Code

National Fire Protection Association (NFPA) Standard NFPA 70B Recommended Practice For Electrical Equipment Maintenance

Underwriters Laboratories Standard 1572 UL Standard for Safety High Intensity Discharge Lighting Fixtures

Underwriters Laboratories Standard 1598 (5th Edition): Standard for Luminaries

*While NFPA documents are the global standard used by AIG, international equivalents may be acceptable.

For more information, contact your local AIG Risk Engineer.