



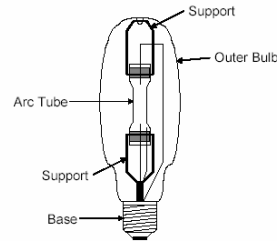
**BACKGROUND**

A small fire at the Harvard University greenhouse was caused by the failure of an open metal halide lamp. When the lamp failed, the inner arc tube ruptured (inner arc tube can reach temperatures as high as 2000° F) and penetrated the exterior bulb. Particles from the arc tube ignited a stack of combustible plastic trays, fortunately there was no major structural damage and materials were salvaged.

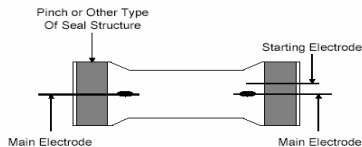
**INTRODUCTION**

Metal halide systems remain the preferred technology for many commercial and industrial applications for sports lighting, athletic areas and warehousing. In many cases, metal halide lighting is the only practical lighting option.

Normally the failure of a lamp fails to illuminate when it is energized; however, on occasion, the lamp can fail violently or rupture. Metal halide lamps have been suspected as the ignition source in a number of fires and may increase the risk of fire.



Metal halide lamps are constructed with an outer bulb with an internal arc tube made of quartz. The arc tube operates under high pressure at very high temperatures (internal pressures of 70 – 90 psi and temperatures near 2000 F.)



The arc tube and outer bulb may unexpectedly rupture due to internal causes or external factors such as a system failure or misapplication. The possibility of lamp failure increases significantly as it approaches and exceeds its rated life. The failure rate with a rupture of the outer bulb is less than 1 in 100,000.

The American National Standards Institute (ANSI) has three classifications for metal halide lamps:

- E**-type lamps can only be used in suitably rated **enclosed** luminaries;
- S**-type lamps may be used in **open** luminaires if certain conditions are met;
- O**-type lamps may be used in **open** luminaires.

The S-type lamps can only operate in an open fixture when operated within 15° of verticle and provided the installation is not near people or flammabel or combustible materials. The O-type lamps generally have an additional quartz shroud around the arc tube that can contain the arc tube fragments or reduce their momentum sufficiently that they will not break the outer glass bulb. Lamps with a protective shroud are frequently designated as MP-type metal halide lamps.

**It should be noted that lamps that have a plastic safety coating cannot contain an arc tube rupture.**



Exclusionary sockets are available which permit an O-type lamp to be installed but prevent the installation of E or S-type lamps.

## **METAL HALIDE SAFETY – FIRE LOSS CONTROL RECOMMENDATIONS**

### **Follow the Manufacturers Installation Guidelines**

- All wiring (repairs and new) must be done by a licensed electrician and a permit filed with Cambridge/Boston Inspectional Services Department.
- Insure that the fixtures and lamps are compatible. Incompatibility can result in a fire. Never alter or remove components of the lamp fixture. If the fixture is equipped with a shield, insure that the shield is replaced after changing lamps.
- Do not remove or insert lamp while power is on. Handle lamps with clean cotton gloves - fingerprints, greases or oils can result in premature lamp failure.
- If the outer glass bulb is broken, shut off power immediately and remove lamp after it has cooled. **This style of lamp can cause serious skin burn and eye inflammation (photokeratitis) from shortwave ultraviolet radiation if the outer envelop of the lamp is broken or punctured.**
- Hang the fixture in the proper orientation and to manufacturer specifications.
- Follow the manufacturer's instructions for dimming metal halide lamps. Excessive dimming can increase the risk of an arc tube rupture occurring.
- Do not locate lamps directly above flammable or combustible materials, e.g. in warehouses. Locate lamps over the centre of aisles rather than over the storage.
- Never expose operating lamp to moisture (such as rain, sleet or snow).

### **Cycle Lamps Weekly**

- Lamps that operate continuously, 24 hours a day 7 days a week, implement a procedure to **turn off the lamps once per week for at least 15 minutes**. This will allow the lamp to cool. When re-energizing the lamp, the components that have deteriorated are likely not to relight.
- Implement a procedure to replace all metal halide lamps before they have reached their anticipated useful life. Lamp failures increase as the lamp reaches its end of life period.

### **Replace Open Style Fixtures**

- Replace open style fixtures with fixtures that meet 2005 NFPA 70 Code. The new open style fixture will only accept a lamp that is self enclosed and will not rupture upon a failure.

### **Explore Alternative Lighting Systems**

- Can the lamps be replaced with a less hazardous system such as fluorescent lamps?

## **ADDITIONAL INFORMATION**

NEMA “Best Practices for Metal Halide Lighting Systems, Plus Questions and Answers about Lamp Ruptures in Metal Halide Lighting Systems.” September 12, 2004

NEMA “A Lighting Systems Division Information Bulletin – Changes to the 2005 NEC Will Impact Future Metal Halide Systems Options.” July 23, 2004

NEMA “Marking Luminarie Codes on Metal Halide Lamps.” July 1, 2003

*Available on-line from the National Electric Manufacturers Association (NEMA) [www.nema.org](http://www.nema.org)*