

# High Intensity Discharge Lamps - General Information

## **Introduction**

High Pressure Sodium (HPS), Metal Halide, Mercury Vapor and Self-Ballasted Mercury Lamps are all high intensity electric discharge lamps. Except for self-ballasted lamps auxiliary equipment such as ballasts and starters must be provided for proper starting and operation of each type in accordance with American National Standards Institute (ANSI) specifications.

Low Pressure Sodium lamps, although technically not high intensity discharge lamps, are used in many similar applications. As with HID lamps they require auxiliary equipment for proper starting and operation. These lamps which have efficacies up to 200 lumens per watt have a mixture of neon and argon gas plus sodium metal in the arc tube and an evacuated outer bulb. When voltage is applied to the lamp the arc discharge is through the neon and argon gas. As the sodium metal in the arc tube heats up and vaporizes, the characteristic yellow amber color of sodium is achieved.

## **Application**

These lamps are for general lighting applications, indoors and outdoors, and have found acceptance in industrial, roadway and security applications. HID lamps are not covered by manufacturers warranty if used on dimming ballasts.

**Nominal Wattage of HPS Lamps:** Lamp wattage varies during life, because of ballast and lamp characteristics. Ballast data should be reviewed for actual wattage levels.

**Voltage Control:** An interruption in the power supply or a sudden voltage drop may extinguish the arc. Before the lamp will relight, it must cool sufficiently, reducing the vapor pressure to a point where the arc will restrike with available voltage. HID types take 3 to 20 minutes, depending on type of lamp and luminaire. A standby arc tube feature is available for 150w, 250w, 400w, and 1000w HPS lamps. These lamps will provide light as soon as power is restored after a momentary interruption.

**Emission Material:** HPS lamps use a special emission material in the electrodes which provide voltage stability throughout the life of the lamp, thus providing long life and excellent lumen maintenance.

**Color Quality:** The standard color HPS lamps have a chromaticity of 2100K and CRI of 21, but HPS lamps are also available in improved color quality and near incandescent color quality lamps. The improved color quality lamps have a color temperature of 2200K and a CRI of 65 while near incandescent color quality lamps have a color temperature of 2600K and a CRI of 85. The near incandescent quality lamps also require a different ballast than standard color or improved color quality lamps of similar wattages.

**Outer Bulb Material:** The outer bulb is made of heat resistant material to provide strength and thermal shock resistance during normal application.

**Lamp Bases:** All High Pressure Sodium lamps have a nickel plated brass base which minimizes base-to-socket seizure which can occur with long-lived lamps. For other HID lamps a brass base is used and a coating is applied to the base to give protection for corrosion and to ensure easy removal from the socket.

## **METAL HALIDE AND MERCURY VAPOR LAMPS**

### **SELF-EXTINGUISHING LAMPS**

Some lamps are designed to reduce the danger of possible injury from shortwave ultraviolet radiation. The lamp will self-extinguish automatically within 15 minutes after the outer envelope is broken by any means, accidental or intentional. These lamps are particularly suited for use in open luminaires where the outer envelope is vulnerable to breakage, and the risk of exposure to ultraviolet radiation is present. However, the lamp's ability to self-extinguish does not protect against the danger of breakage itself. Accordingly, the users are advised to follow good lamping practices noted in the Operating Instructions listed below.

In case of lamp failure, for safety and to preserve ballast life, turn off electric power and replace lamp promptly.

**WARNING:** Non Self-Extinguishing lamps can cause serious skin burn and eye inflammation from shortwave ultraviolet radiation if the outer envelope of the lamp is broken or punctured. Do not use where people will remain for more than a few minutes unless adequate shielding or other safety precautions are used. Certain lamps that will automatically extinguish when the outer envelope is broken or punctured are available and annotated as such in this section.

### **Operating Instructions**

1. TURN LAMPS OFF AT LEAST ONCE PER WEEK FOR AT LEAST 15 MINUTES, in systems which are otherwise operating on a continuous basis (24 hours/day - 7 days/week).
2. RELAMP FIXTURES AT OR BEFORE THE END OF RATED LIFE. Allowing such lamps to operate until they fail is not advised and may increase the possibility of inner arc tube rupture.
3. OPERATE LAMP ONLY IN ITS RECOMMENDED POSITION. OPERATE LAMP WITH PROPER CIRCUITS AND AUXILIARY EQUIPMENT.

**WARNING:** The arc tubes of Metal Halide lamps are designed to operate under high pressure and at temperatures up to 900 degrees C. If the arc tube ruptures for any reason, the outer bulb might break and pieces of extremely hot glass might be discharged into the surrounding environment, with an associated risk of property damage or personal injury. Operating Instructions must be followed to reduce the possibility of arc tube rupture.