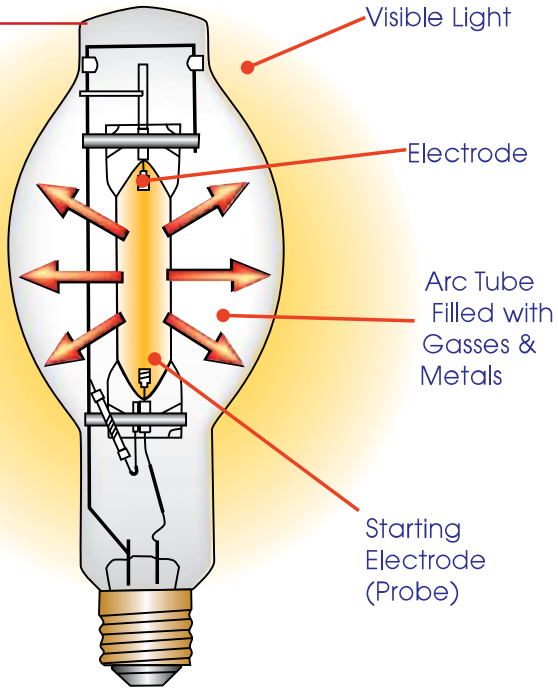
HID Basics

HOW IT WORKS

The operational concept behind HID lamps is very similar to that of fluorescent lamps. Electrodes are positioned at either end of a tube, whose chamber is filled with gas and metals such as mercury. An electrical charge passes from one electrode to the other. In fluorescent lamps, this charge creates ultraviolet (UV) light, which converts to visible light once it passes through the phosphors on the tube's interior.



In an HID lamp, the electrical arc, gasses and metals are contained in what is known as the arc tube. The arc tube is made from either quartz (used in mercury vapor and metal halide lamps) or transparent ceramic (used in high-pressure sodium lamps because of their high temperature). All arc tubes are housed within a larger outer glass envelope.

Unlike fluorescent lamps, the arc tube of HID lamps is filled with gas at a very high rate of pressure (up to 50 psi). This allows the electrical arc created by the electrodes to operate in the visible part of the spectrum, producing usable light without the addition of phosphors.

Like fluorescents, HID lamps require a ballast to control the electrical current in the arc tube. Certain HID lamps also require an ignitor, which produces a high voltage to pulse the arc tube, allowing the arc to strike.

The biggest difference in HID lamps is the fact that they need a start-up time to reach their full brightness. This usually takes five to 10 minutes, during which time the lamp will flicker until the metal inside fully vaporizes and the lamp reaches is full operating temperature.

Color Shifting

New HID lamps require a "burn in" period of approximately 100 hours before the lamp will reach its true specified color. Until this process is completed, lamps can be unstable and vary in color.

As HID lamps age, chemical changes occur that cause color shifting. The shifts vary depending on the lamp type. Standard probe start lamps tend to shift color about twice as much as pulse start lamps. Results vary from lamp to lamp.

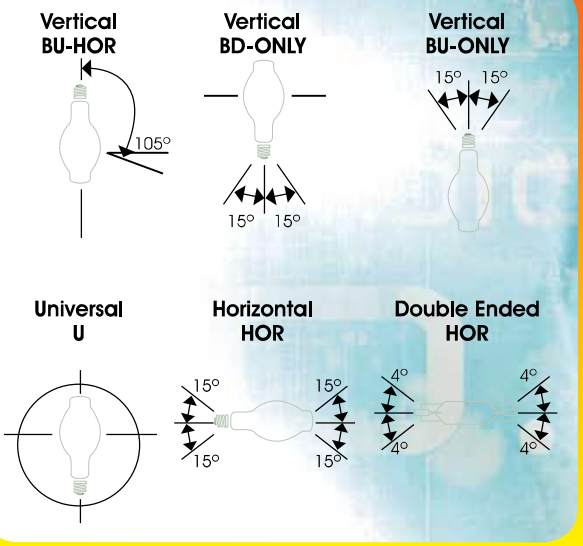
FACT:
HID lamp color is rated in kelvins and is reffered to as its Correlated Color Temperature (CCT).

FACT:
Colors are created by using different arc tube designs and changing the mixture of chemicals within the tube.

It is recommended to conduct a group relamping once it is determined that a lamp or group of lamps is changing color or failing. This way, the area being illuminated will maintain an even balance of color and light.

Burning Positions

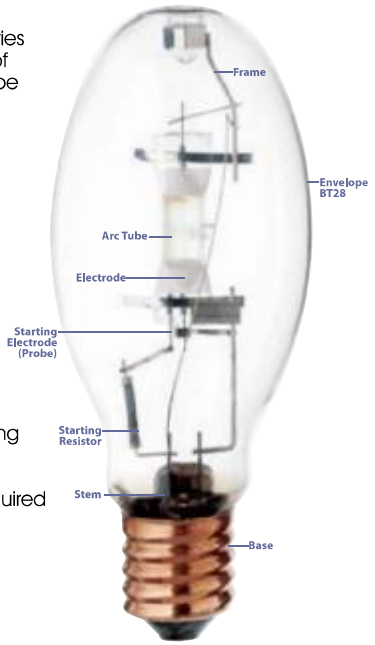
Certain HID lamps have been designed to operate in a specific position to achieve targeted life or performance goals. These examples illustrate these burning positions



Major HID Categories

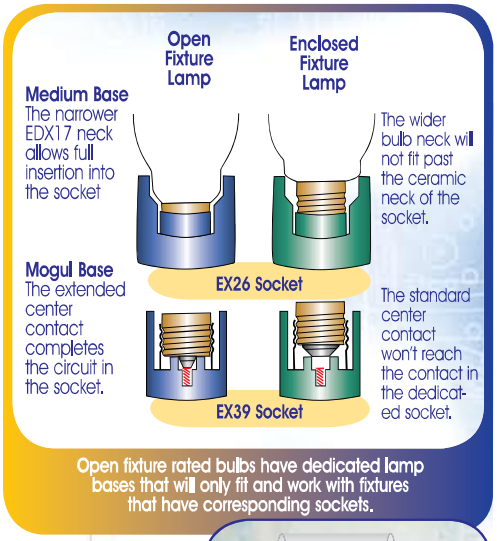
Mercury Vapor

The original of the three HID categories operates by using a small amount of liquid mercury sealed in a quartz tube with argon gas. The arc created by the mercury vapor lamp produces both visible and invisible (UV) light. The visible light is blue-white in color and is best suited for outdoor lighting applications because of its poor color rendering capabilities. Some mercury vapor lamps incorporate phosphors similar to those used in fluorescent lamps to improve color to a certain degree. Mercury vapor lamps can achieve life spans of 10,000 to 24,000 hours.



Typical applications:
Street lighting, industrial hi-bay, parking lots, building flood lighting, general flood
lighting, places where long life is required and color rendering is not critical.

Open Fixture Applications



There is a series of HID lamps that has a protective glass shroud around the arc tube that acts as a barrier to block any particles from exiting the lamp's outer bulb.

Metal Halide

Metal halide lamps are similar to mercury vapor models except for the addition of metal halides of sodium iodide and scandium iodide. Certain metal halide lamps feature other iodides to improve the efficiency and color balance of the lamp. Metal halide represents the most popular and widely used HID category.

Typical applications:
General lighting such as commercial/industrial/outdoor flood lighting where good color and high efficiency are desired.

Since the arc tube of the HID lamp is a highly pressurized environment, it is mandatory that the fixture that houses the lamp have a protective lens. This lens will contain glass fragments or other hot particles should the arc tube experience a failure.

High Pressure Sodium/ Low Pressure Sodium (SOX)

This series of HID lamps incorporates solid sodium, mercury and xenon or a neon/argon gas mixture within the arc tube. This combination of metals and gasses produces an orange-white light in the high-pressure version and a yellow light in the low-pressure model. Both lamps boast a luminous efficiency that is much greater than its mercury vapor or metal halide counterparts.

Typical applications:
Street lighting, industrial hi-bay, parking lots, building flood lighting and general area lighting.