

H. I. D Light description

High-pressure sodium lamps contain an internal arc tube made of a translucent ceramic material (a form of aluminium oxide known as "polycrystalline alumina"). Glass and quartz cannot be used since they cannot maintain structural strength at the high temperatures (up to 1300 degrees C) encountered here, and hot sodium chemically attacks quartz and glass. Like other HID lamps, the arc tube is enclosed in an outer glass envelope. A small amount of metallic (solid) sodium in addition to mercury is sealed in a xenon gas fill inside the ceramic arc tube. Some versions of this lamp use a neon-argon mixture instead of xenon. Basic operation is otherwise similar to metal halide or mercury lamps. High-pressure sodium lamps produce an orange-white light and have a luminous efficiency much higher than mercury vapour or metal halide lamps.

Metal halide lamps are constructed along similar lines to mercury vapour lamps. However, in addition to the mercury and argon, various metal halides are included in the gas fill. The most popular combination is sodium iodide and scandium iodide. A few versions of this lamp have lithium iodide as well. A much less common version has sodium iodide, thallium iodide, and indium iodide. The use of these compounds increases the luminous efficiency and results in a more pleasing color balance than the raw arc of the mercury vapour lamp. Thus, no phosphor is needed to produce a color approaching similar to that of a cool white fluorescent lamp with more green and yellow than a mercury vapour lamp (without correction). Some metal halide lamps have a phosphor that adds some orange-ish red light, but not much, since the metal halide arc does not emit much UV.

High-pressure mercury vapour lamps contain an internal arc tube made of quartz enclosed in an outer glass envelope. A small amount of metallic (liquid) mercury is sealed in an argon gas fill inside the quartz tube. After the warm-up period, the arc emits both visible and invisible (UV) light. High-pressure mercury vapour lamps (without color correction) produce a blue-white light directly from their discharge arc. Phosphors similar to those used for fluorescent lamps can be used to give these a color closer to natural light. (Without this color correction, people tend to look like cadavers).

Mercury vapour lamps have the longest life of this class of bulbs - 10,000 to 24,000 hours. The technology was first introduced in 1934 and was the first of the commercially viable HID lamps.