

## 2.12 Plasma Lamp

Plasma lamps are a type of gas discharge lamp energized by radio frequency (RF) power.

High-efficiency plasma (HEP) lamps have been introduced to the general lighting market.

Plasma lamps with an internal phosphor coating are called external electrode fluorescent lamps (EEFL); these external electrodes or terminal conductors which provide modern plasma lamps are a family of light sources that generate light by exciting plasma inside a closed transparent burner or bulb using radio frequency (RF) power. Typically, such lamps use a noble gas or a mixture of these gases and

additional materials such as metal halides,

sodium, mercury or sulfur. In modern plasma lamps, a waveguide is used to constrain and focus the electrical field into the plasma.

In operation, the gas is ionized, and free electrons, accelerated by the electrical field, collide with gas and metal atoms. Some atomic electrons circling around the gas and metal atoms are excited by these collisions, bringing them to a higher energy state. When the electron falls back to its original state, it emits a photon, resulting in visible light or ultraviolet radiation, depending on the fill materials.



Figure 72

Inside the back of the lamp, a diffuse yet highly reflective material is used to reflect all of this light to the forward direction in a lambertian pattern. The colour of the light is tailored by the fill chemistry inside the lamp to provide a naturally white light with good colour rendering.