

## Technical Sheet - Induction Lighting<sup>i</sup>

### Introduction

An induction lighting system is based on a technology that is fundamentally different from the conventional gas-discharge lamps, such as fluorescent, high-intensity discharge (HID) and incandescent lamps. The failures of these conventional gas-discharge lamps are mostly due to the degradation of filament or electrodes. On the other hand, Induction lighting technology is an electrodeless system; the technology combines the basic principals of electromagnetic induction and gas discharge to create a light bulb without filament or electrodes.

### Technology Description

Induction lighting systems can be different in shapes and sizes; however the principal of operation is essentially the same. Induction lighting is based on the well-known principle of induction and light generation via a gas discharge.

The sequence of operation is as follows:

The high frequency generator produces a high-frequency electrical current and transmits it to the induction coil.

Then, the current passing through the induction coil generates a fluctuating electromagnetic field within the lamp.

This fluctuating field excites and ionizes the mercury atoms in the gas fill.

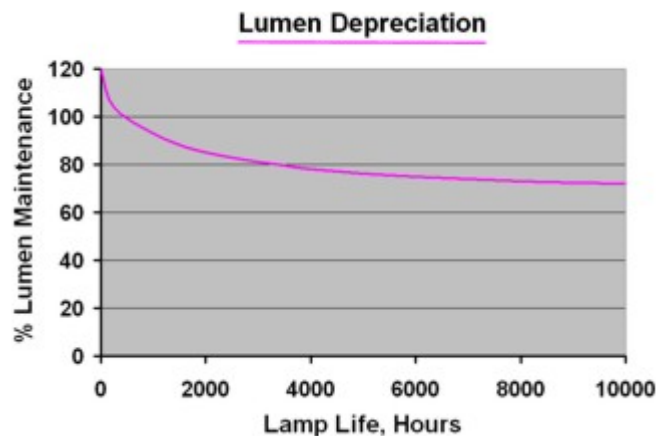
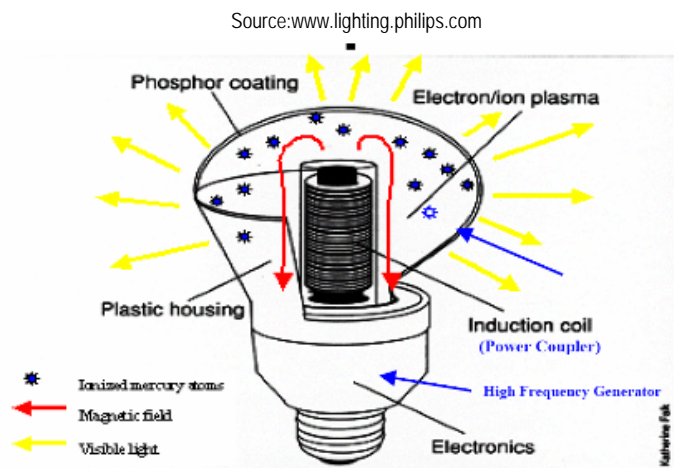
Electrons from these excited atoms fall back from this higher energy state to the lower stable level and consequently emit ultraviolet (UV) radiations.

The UV radiations interact with the phosphor powders coated inside the lamp and then convert it to visible light.

### Benefits of Induction Lighting

The elimination of filaments and electrodes results in an induction lamp of unmatched durability. According to manufactures, induction lamps will last over 100,000 hours or 25 years. Other advantages of the induction lighting system include:

- High “lumen maintenance” factor: Induction lamps produce 70% of its light output up to 60,000 hours. The rated life is 5-10 times longer than Metal Halide (rated at 7,500 to 20,000 hours at 10 hours/start) and about 7 times longer than fluorescent (at 10 hours/start).



- High Efficiency: Induction lamps have an efficacy ranging from 80 to 85 lumens per total watt input. That is higher than comparable-wattage MH and LPS light fixtures but it is lower than some T5 fixtures.
- Instant flicker-free starting: Induction lamps will restart immediately and will achieve full light level from a cold start almost instantly. Other conventional gas-discharge lamps experience a “restrike time”, which may take several minutes to sufficiently warm up to achieve full light output.

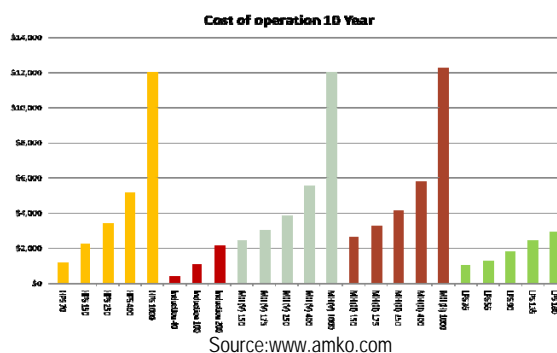
## Applications

Induction lighting is available in a variety of wattages; therefore, it is suitable for a wide range of applications. Some of the practical applications for induction lighting are as follows:

- Tunnels, bridges, roadways, street lights where access to the light fixtures are hazardous, inconvenient or difficult to reach.
- High-ceiling facilities, such as gymnasiums, warehouses, tradeshow, industrial buildings, etc.
- Extremely low temperature environments, such as walk-in freezers and cold storages lighting.
- Applications that require instant-on capacity, such as public gathering places.
- Interior applications, such as floodlights, and down lights.

## Shortcomings

Induction lighting usually costs more than other types of lighting system. However, they are energy efficient and last longer than conventional gas-discharge lamps. The higher initial cost of the induction lighting is usually offset by reduced number of fixtures, which made possible by the higher light output. In addition, induction lighting system offers substantial savings in maintenance costs due to a virtually zero maintenance requirement. The system will also eliminate the inconvenience and indirect costs due to service interruption for maintenance work.



## Sure Bet Incentives

Sure Bet incentives are available for induction lighting and the program incentives are separated into 2 categories - Retrofit and New Construction Incentives.

For a retrofit project, the incentives are available through the Custom Incentive application process where the rebates are calculated based on an annual energy (kWh) savings. For instance, an estimated annual kWh savings are multiplied by 10 and 5 cents during On-Peak and Non On-Peak periods respectively to calculate the incentives for a project in the NV Energy Southern Service Territory in 2009.

For a new construction project, the savings are based on the difference between the installed lighting power and the base case lighting power as determined by the applicable code and standard or local jurisdiction requirement. Please note that the Sure Bet program offers incentives within the utility’s northern and southern service territories and incentive applications are provided separately for each territory and can change from year to year. Please contact a Sure Bet program engineer for more information.

<sup>i</sup> Prepared by KEMA, Inc. KEMA, Inc. is under contract to implement the Sure Bet Program for NV Energy, Inc.