



## Magnetic Induction Lighting Frequently Asked Questions (FAQ)

### Q: How does Magnetic Induction Lighting work?

A: Conventional lighting technology uses electrodes and/or filaments, which are embedded through the lamp envelope (quartz/glass bulb) to bring an electrical current into the interior of the lamp. These filaments or electrodes burn out over time necessitating the replacement of the lamp.



**Induction Lighting uses advanced technology** to produce **high quality light** from a lamp that lasts **for up to 100,000 hours of operation**. The **completely sealed lamp envelope** has no filaments or electrodes to burn out. Power is transferred to the interior of the lamp by means of a **strong magnetic field** generated by inductors which are external to the lamp's envelope - either wrapped around the outside of the tube, or inserted into a cavity inside the lamp. There are **no electrodes** going through the walls of the lamp and **no filament** inside the lamp.

For more information, see our "[How Induction Lamps Work](#)" or our "[The Science Behind Magnetic Induction Lighting](#)" publications in our [on-line library](#).

### Q: Why do Magnetic Induction Lamps last so long?

A: In conventional lighting technology, the places where the electrodes pass through the envelope (wall) of the lamp, are subject to thermal stresses due to the heating and cooling of the lamp as it is turned on and off. Over time, this causes micro-cracks which can allow atmospheric gasses to enter the lamp contaminating the interior. In addition, the filaments or electrodes are heated by the passage of the electrical current, causing them to evaporate over the lifetime of the lamp. For example, the black rings often seen around the ends of fluorescent tubes nearing the end of their service life, are caused by the condensation of evaporated materials from the filaments inside the tubes.

Since the **magnetic induction lamps are completely sealed** and have **no filaments and no electrodes** penetrating the lamp walls, there is no possibility of thermal stresses at the places where the electrodes (wires) penetrate the lamp walls, as *there are no electrodes*, and there are *filaments inside the lamp to evaporate over time*.

### Q: How does Induction Lighting save energy and money?

A: Induction lights have a **high energy conversion efficiency** ranging from **60 to 85 Lumens per Watt (L/W)** depending on the type and model, with **higher wattages typically being more efficient**. This means that **more of the electricity provided to the lamp is converted into light** for your application.

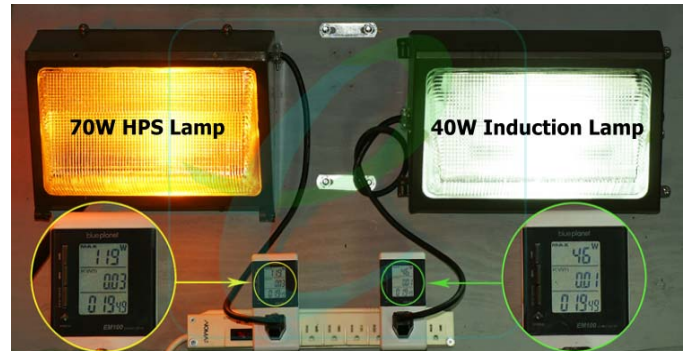
In addition, induction lamps use **electronic ballasts which are 95% to 99% efficient** - only 1% ~ 5% of the power is wasted as heat. The typical "Core & Coil" ballast found in most

HID lighting is between 75% ~ 85% efficient - Between 15% and 25% of the power is lost (typically as heat).

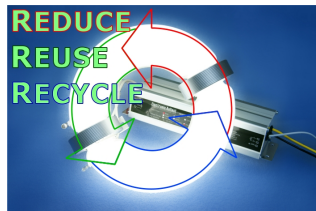
Induction Lamp also produce **higher Visually Effective Lumens (VEL)**, that is light useful to human vision. In many applications, conventional lighting can be replaced with Induction Lamps of half the wattage as the conventional lamps, while still producing the same, or better, apparent brightness of lighting.

Induction lighting can **save between 35% and 75% in energy and maintenance costs** through higher light output and less wasted energy!

Due to the **100,000 hour lifespan** of external inductor lamps, **maintenance and re-lamping costs are also reduced** since the lamps **do not have to be replaced as often** as conventional technology lamps.



### Q: Is induction lighting environmentally friendly?



**A:** Yes! Induction lamps are the most environmentally friendly high power lighting technology available today. While the induction lamps do contain mercury, it is in a **solid amalgam** form, making it easy to recover in the event of accidental breakage, or at the end-of-lamp-life. If the lamp is broken, unlike other types of lighting, there is **no liquid mercury** which can spill and cause local contamination.

Since induction lamps have such long lifespan, and **do not have to be replaced as frequently as conventional lamps**, they **use less material and energy to manufacture**, and **they use less mercury over their lifetimes** than HID lighting. Finally, **Induction lighting uses less energy** than conventional lighting while producing the same or equivalent light levels, thus it **helps to reduce CO<sub>2</sub> emissions** from electrical power generation plants. Induction Lamps are also easy to break down at end-of-life so the metal, glass and the remaining mercury amalgam **can be re-cycled**.

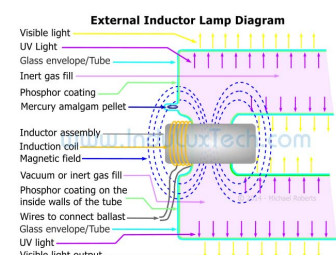
For more information see our “**Environmental Aspects Of Magnetic Induction Lamps**” publication in our [on-line library](#).

### Q: What are the main components of Induction Lights?

**A:** The two main components are the **electrodeless lamp** (bulb or tube), with its inductors wrapped around the outside (or inserted into a cavity in the interior) of the lamp; and the **electronic ballast** (occasionally called a generator), which produces the high frequency signals used to energize the magnetic inductors which power the lamps.

### Q: What are the two main types of Magnetic Induction Lamps?

**A:** The two main types of lamps are the **external inductor** types and the **internal inductor** types. The external inductor types are tubular and have the magnetic inductor (or inductors) wrapped around the outside of the tube. The internal inductor types are generally light-bulb or globe shaped and have the magnetic inductors inserted into a test-tube like cavity located inside the center of the lamp.



**Q: Are there significant differences between external and internal inductor lamps?**

**A:** Other than the form-factor (shape) of the two different types, the major differences are in **efficiency and lifespan**:

**External inductor lamps** have **higher conversion efficiency** and **greater light output** than the internal inductor types. They have **life-spans in the 95,000 ~100,000 hour** range. Since the inductors are external to the lamp body, the **heat from the inductors is easier to dissipate** and the lamps **run at lower temperatures** thus **increasing lifespan**.

**Internal inductor lamps** generally have **lower conversion efficiencies** (produce less light from the power provided) and have a **lifespan in the 55,000 to 65,000 hour** range. The inductors are located inside the lamp body and as a result, **the lamps tend to run at higher temperatures** which **shortens their lifespan**.

**Q: Are dedicated fixtures required for induction lamps?**



**A:** In most cases, yes. Induction lamps need to be **installed into suitable fixtures** which have the **right thermal management properties to insure correct operation**.

However, certain fixtures can be **retrofitted** with external inductor lamps if there is sufficient space to accommodate the lamp and the ballast in the existing fixture. There are some **smaller**, internal inductor lamps which can be used to some types of lamps provided there is sufficient space in the fixture for the lamp and ballast.

**Q: Does the operation of induction lighting interfere with electronic devices or communications equipment (produce RFI)?**

**A:** While some early versions of internal inductor lamps did produce RFI (Radio Frequency Interference), under normal conditions, there is **no interference produced by the lamps**. If there is RFI from an induction lamp, it is most likely to come from Induction Lamps that use high frequency ballasts.

Induction Lamps are driven by ballasts that are **compliant with FCC and other international rules**. **FCC certified products produce less RFI than a computer or microwave oven**. **Cell phones, walkie-talkies and other mobile devices generally will not experience any interruption** of service when operating under our induction lighting.

Induction lamps **may cause interference with very sensitive laboratory and medical equipment** such as **CAT and MRI scanners**. If induction lighting is to be used in those kinds of areas, care should be taken to **insure that the fixture is properly grounded**. It would also be **prudent to conduct tests of a sample induction lamp fixture** to determine if there is any interference with sensitive equipment before installing the lighting.

**Q: Are Induction Lamp fixtures affected by temperature?**

**A:** Induction lamps, and their ballasts, are solid state devices which have stable operation over a very wide range of temperatures. Typically they will operate between -35C and +40C (-31F to 104F). When ambient temperatures falls below -5C (23F), there will be an increase in the warm-up time of the lamps - the colder the temperature, the longer the warm-up time. However, the lamps still start with significant light output and still warm-up in less time than conventional HID lighting.



**Q: Are Induction lamps “instant-on” and do they have “hot re-strike”?**

**A:** Yes! The lamps **turn on instantly** and produce between 75% to 80% of full light **output immediately**. The lamps take between 60 and 180 seconds to reach 100% of light output depending on the model - the **warm-up cycle is barely perceptible to the eye**. If there is a **momentary power interruption**, unlike HID lighting, the **“hot re-strike” feature** of the Induction Lamps **turns them back on immediately** when the power is restored - they do not have to cool down and then re-strike like most HID lighting.

**Q: Does lamp orientation or vibration affect Induction Lighting?**

**A:** The performance of induction lamps is not affected by the operating position (orientation) of the lamp. Similarly, vibrations do not affect the Induction Lamps as they have no filaments or electrodes - unless the vibrations is so severe as to produce physical damage to the lamps or fixtures. Induction Lamps have been used on bridges, in tunnels, on subway/ metro trains, and in roadway lighting applications with proven reliability and durability.

**Q: Will products or materials displayed under Induction Lamps become faded or damaged over time?**

**A:** No! The **amount of ultraviolet light produced by induction lamps** is much lower **than that produced by other types of HID lighting**. For extra sensitive materials, you can use Induction Lighting fixtures with a glass lens/diffuser which will block all UV emissions. In addition, Induction Lamps run at much lower temperatures than conventional HID lighting and radiate very little Infra-red (heat).

The **negligible UV output from Induction Lamps** makes them an **ideal choice** for lighting applications such as **long-term displays, museums or galleries**, as they can provide **energy efficient, bright, high colour temperature lighting, with good colour rendering, but without any significant UV**.



**Q: Can Induction Lighting fixtures be used outdoors?**

**A:** The IP rating of Induction Lighting fixtures will determine if they can be used indoors or outdoors. Generally speaking, **any fixture rated IP45 or higher can be used outdoors** and/or in damp locations.

**For the best results, IP65 rated fixtures** are recommended as they are water resistant.

**Q: Can the ballast be remotely mounted from the Induction Lamp/Fixture?**

**A:** While it is **best to have the ballast in close proximity to the lamp**, the electronic ballast can generally be installed up to 4 meters (13.1 ft) away from the lamp, provided that the wiring between the lamp and ballast is enclosed in a properly grounded metal conduit - you should check with the manufacturer first.

**There are some specialty ballasts available** that can drive induction lamps from a distance of up to 15 meters (about 50 ft). These might be a useful option in an installation where it is desirable to locate the ballasts at some distance from the lamps in a more centralized location, or for example, in street-light poles or decorative pole-top lights, where having the ballast in the base of the pole allows easy access.



**Q: Where can Induction Lighting be used?**

**A: Induction Lighting can be used in most commercial and industrial lighting applications** which would usually use Mercury Vapour (MV), Metal Halide (MH), Low Pressure Sodium (LPS/SOX) or High Pressure Sodium (HPS) lamps.

These applications include atriums, office buildings, shopping malls, supermarkets, airports, bus & train stations, food markets, retail & Big-box stores, schools, libraries, factories, warehouses, cold storage facilities, service bays, aircraft hangars, underground garages, tunnels, badminton courts, arenas, gymnasiums and other sports facilities.

Induction lamps are also suitable for outdoor use in climates (where the coldest temperatures do not exceed -35C) as security/perimeter lighting, street/roadway lighting, in parking lots, on bridges, in tunnels, for tennis courts, ballparks, shipping docks, airports, bus & train station exterior lighting, and car dealership lots.

For more information, see the “**Induction Lamp Technology Application Guidelines**” publication in our [on-line library](#).

**Example Application Photos:**

