InduLux Technologies Inc.
56 Stanley Street, Goderich, Ontario, Canada N7A 3K5
Tel: 519-955-4354 Fax: 519-524-8416
www.InduLuxTech.com

Induction Lighting - Frequently Asked Questions (FAQ)

Q: How does Magnetic Induction Lighting work?

A: Conventional lighting technology uses electrodes or filaments, which are embedded through the lamp envelope (glass/quartz) to bring an electrical current to 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 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.

For more details see http://knol.google.com/k/how-induction-lamps-work#

Q: Why do Magnetic Induction Lamps last so long?

A: In conventional lighting technology, the points where the wires for the filaments or electrodes pass through the envelope (wall) of the lamp, are subject to thermal stresses due to the heating and cooling of the lamp. 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 time. For example: The black rings often seen around the ends of fluorescent tubes are caused by the condensation of evaporated metals from the filaments.

Induction lamps are completely sealed and have no filaments or electrodes penetrating the lamp walls. There is no possibility of thermal stress at the places where wires penetrate the light walls as there are *no wires*, and there are *no filaments or electrodes inside the lamp* to evaporate.

Q: How does Induction Lighting save energy and money?

A: Induction Lights have a high energy conversion efficient ranging from 60 to 90 Lumens per Watt (L/W). This means that more of the electricity provided to the lamp is converted into light. In addition, induction lamps use electronic ballast which are 95% to 98% efficient (only 2% ~ 5% of the power is lost as heat), compared to the typical "core & coil" ballasts which are only between 75% and 85% efficient (between 15% and 25% of the power is lost). Induction lamps can save between *35% and 60% in energy costs* through higher light output and less wasted energy! Some advanced fixtures can provide energy savings up to 75% over the conventional fixtures they replace.

Due to the expected 100,000 hour operating lifespan of the induction lamps, maintenance 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 lighting technology available today. While the lamps do contain mercury, it is in a sold amalgam format. If there is accidental breakage of the light, the mercury amalgam is easily recovered without polluting the area where the lamp was broken. The sold mercury amalgam is also easily recovered and recycled at end of lamp life. Since the lamps last so long and do not have to be replaced as frequently as conventional lamps, they use less material and

energy in manufacturing and recycling. Finally, Induction Lighting saves energy and the related Co2 and other emissions from electrical power generation.

For more information, see http://knol.google.com/k/environmental-aspects-of-magnetic-induction-lamps#

Q: What are the main components of Induction Lights?

A: The two main components are the electrodeless lamp with its inductors wrapped around the outside (or inserted into a cavity in the interior), and the electronic ballast which provides the high frequency signals to energize the magnetic inductors.

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

A: The two main types of Induction Lights are external inductor and internal inductor lamps. The external inductor lamps are tubular and have the induction coils (magnets) wrapped around the outside of the tube. The internal inductor lamps are generally light bulb-shaped and have the induction coil (magnet) inserted into a test-tube like cavity located inside the lamp.

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

A: Other than the form factor (shape), the major differences are efficiency and lifespan. The external inductor lamps have higher conversion efficiency (produce more light for the same amount of power) than internal inductor types, and have a longer lifespan in the 90,000~100,000 hour range. The internal inductor lamps have lower conversion efficiency than external inductor types (produce less light for the same amount of power), and have a lifespan in the 60,000~75,000 hour range.

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 properties to insure correct operation. Certain existing fixtures can be successfully retrofitted.

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, under normal operating conditions, there is no interference produced by the lamps. Almost all modern Induction Lamps are compliant with FCC ad international rules. Cell phones and other mobile devices will not experience any interruption in service due to induction lights. FCC certified products produce no more Radio Frequency Interference (RFI) than a computer or microwave oven. Induction Lighting meeting the FCC standards will not affect the use of two-way radios or cell phones operated in the area lit with Induction Lights.

Induction Lamps may cause interference with certain very sensitive laboratory and medical equipment such as CAT or MRI scanners. If Induction Lighting is to be used in such applications, care should be taken to insure that the fixture is properly grounded. It would also be prudent to conduct tests of a sample Induction Light fixture to determine of there is any interference with sensitive equipment.

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 ambient temperature range, typically -35C to +40C (-31° F to 104° F). When ambient temperatures fall below -20C (-4F), there will be an increase in the induction lighting warm-up time of 1 to 2 minutes.

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Q: Are Induction Lamps "instant on" and do they offer "hot re-strike"?

A: *Yes!* The lamps turn on instantly and produce between 75% and 80% of full output immediately. The lights take between 90 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, the "hot re-strike" feature of Induction Lamps turns them back on immediately when the power is restored .

Q: Does lamp orientation or vibration affect Induction Lighting?

A: The performance of Induction Lamps are not affected by the operating position (orientation). Similarly, vibrations do not affect the induction lamps as they have no electrodes of filaments. They have been used on bridges, in tunnels, and on outdoor signage with proven reliability and durability.

Q: Will products or materials become damaged or faded under Induction Lighting?

A: The amount of ultraviolet light generated by and Induction Lamp is lower than that generated by a typical fluorescent tube. For extra sensitive materials, you can use Induction Lighting fixtures with a glass lens/diffuser which will block all UV emissions.

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

A: The electronic ballast can generally be installed up to 4 meters 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 supplier first.

Q: Can Induction Lighting fixtures be used outdoors?

A: The IP rating of an Induction Lighting fixture will determine if it can be used indoors or outdoors. Generally speaking, any fixture rated IP54 or higher can be used outdoors or in damp locations. Most suppliers provide IP ratings for their fixtures in the specifications.

Q: Where can Induction Lights be used?

A: Induction Lighting fixtures can be used in many commercial and industrial applications such as office buildings, supermarkets, airports, train stations, retail stores, schools, factories, warehouses, cold storage facilities, arenas and gymnasiums. They are also suitable for outdoor uses such as street lighting, bridges, tunnels, parking lots, shopping centers, tennis courts, shipping docks, and car lots.

Q: Is Induction Lighting safe to install and what is generally involved?

A: Induction Lighting products offered in the NAFTA and EU markets have generally passed rigorous UL, C-UL and/or CE testing and are approved for use by the electrical authorities. Other testing and approval standards apply in various territories. When properly installed by qualified personnel, Induction Lights are a safe, effective, energy saving alternative to conventional lighting technology.

Generally speaking, one simply removes the old, inefficient, lighting fixture and replaces it with an energy efficient, Induction Lighting fixture. Usually little or no re-wiring is required.