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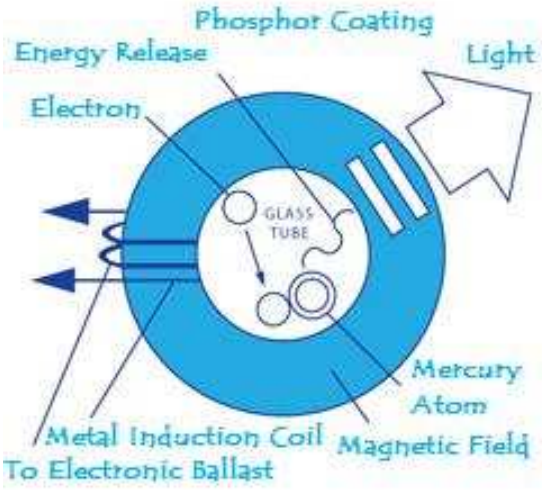
How Induction Lighting Works



An induction lamp is a fluorescent lamp without electrodes or filaments. Rings with magnetic coils create an electromagnetic field with the high frequency that is generated by the electronic ballast. This field goes around the glass filled tube. Electrons discharged by the magnetic coils collide with mercury atoms inside the tube and become excited. These electrons give off energy in the form of invisible UV light. The conversion to visible light occurs when it passes through a phosphor coating on the inside surface of the tube.

The lamp, therefore, relies on the fundamental principles of gas discharge and electromagnetic induction to produce light. As a result, each lamp offers a lifespan that is unmatched. A single induction lamp can last longer than 100 incandescent bulbs, 5 HID, or 5 typical fluorescent lamp changes.

The lack of internal electrodes and very high energy efficiency (high frequency electronic ballasts are 98% efficient), also contribute to the induction lamp's incredible service lifespan of up to 100,000 hours.

Seeing is Believing

Induction lights can most commonly replace light sources that require twice the amount of power- yet produces equal, if not, brighter and better quality light. While traditional lumen measurements may be lower, Induction lighting produces higher Visually Effective Lumens (VEL) than most traditional light sources.

Lower power consumption (lower carbon footprint), longer lifespan, instant lighting/restrikes, better quality lighting- these are all advantages of induction technology.

400W High Pressure Sodium

200W Induction

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Visually Effective Lighting

When measured with a traditional light meter, an induction light is generally measure to be producing ***less*** light than conventional light sources. Yet, to the human eye, induction lights appear to be just as bright, or even ***brighter*** that lights that use double the power. Why the discrepancy? The answer lies in how traditional light meters work, versus how the human eye actually perceives visually effective light.

Traditional measurements of light are based on a standard that was set in 1951 (The 1951 CIE Colour Space Standards). This old standard only takes into account Photopic (primary colour) vision, and does not take into account Scotopic vision (light sensitive- night vision), or the S/P ratio (Scotopic/Photopic ratio). Of the 130 million cells in our eye, about 6 million are cone cells- responsible for Photopic Vision, most sensitive to the longer wavelengths (red/orange). The rest (more than 120 million cells) are rod cells, which are most sensitive to the shorter wavelengths in the lighting spectrum (green-blue), are much more sensitive to light, and are responsible for our Scotopic Vision.

High pressure sodium lamps score high in the traditional light meter measurements, but are actually a poor source of light as far as the human eye is concerned (as it is only in the longer wavelength spectrum- orange/red). Our eyes are built to respond to a “full spectrum” of light, and naturally, both Photopic and Scotopic visions are integral parts of our overall vision. Simply put, traditional methods of measuring light- without any consideration to the S/P ratio- are plain wrong.

The S/P Ratio is a good indication of the quality of the light source, and can be used (when multiplied by traditional lumen measurements) to determine the actual Visually Effective Lumens (VEL) of the source.

S/P RATIO	
Sun + Sky:	**2.47**
6500k Induction Lamp:	**2.25**
5000k Induction Lamp:	**1.96**
4100k Induction Lamp:	**1.62**
Metal Halide (Na/Sc):	1.49
Incandescent (2850k):	1.41
High Pressure Mercury Vapour (400W):	1.33
White High Pressure Sodium(50W):	1.14
Warm White Fluorescent:	1
High Pressure Sodium (400W):	0.66
Low Pressure Sodium (50W):	0.35

Credit: Francis Rubenstein of Berkley Labs, Rensellaer Lighting Research Ctr

The Visually Effective Lumens can be calculated by taking the lumen measurement, multiplied by the corresponding S/P Ratio.

Metal Halide lights, have an average manufacturer’s rating of 56.9 lumens/watt. A **400W** light would, therefore, have: 56.9 x 400 = 22, 760 lumens, multiplied by 1.49 = **33, 912 Visually Effective Lumens**.

6500K Induction Lamps have a manufacturer’s rating of 80 lumens/watt. A **200W** light would have: 80 x 200 = 16, 000 lumens, multiplied by 2.25 S/P ratio = **36, 000 Visually Effective Lumens** (More than a 400W metal halide equivalent- the next strongest contender in terms of S/P ratio and light quality).

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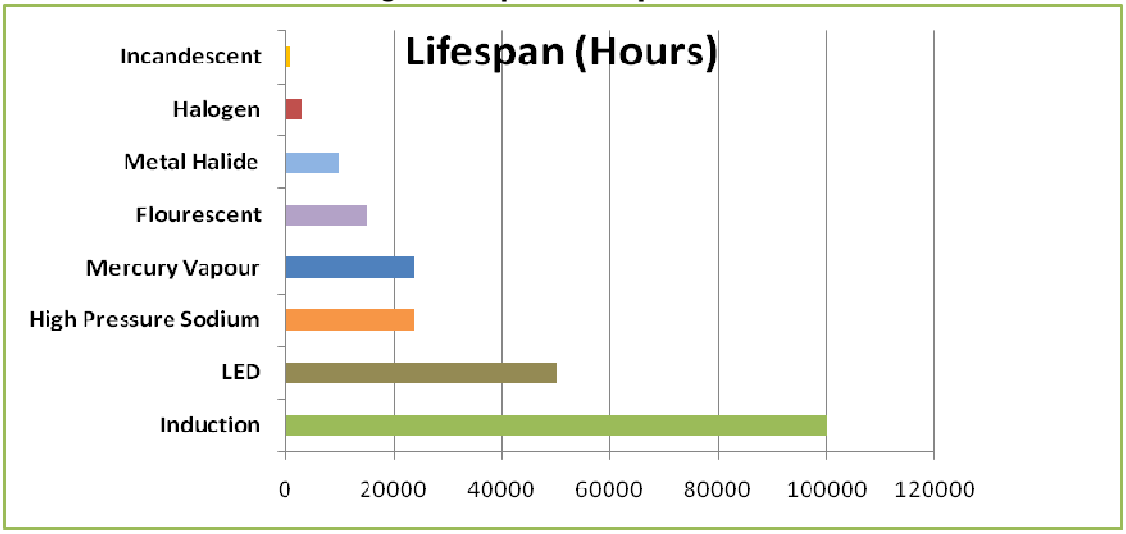
Average Lifespan Comparison Chart



Induction VS. Other Common High-bay Lighting Technologies				
	Induction	Metal Halide	High Pressure Sodium	Mercury Vapour
Warranty	5 years	Generally less than 2 years, if any.		
Lifespan	100000 hrs	10000 hrs	24000 hrs	24000 hrs
Lumen Depreciation (2000 hrs)	5%	40%	30%	45%
Lamp Temperature	80℃ (Lower HVAC Load)	300℃	350℃	300℃
Colour Rendering Index (CRI)	90	60-90	60	45
Start/Restart	Instant	10-15 min		
Flicker/Glare	None	High		
Dimming	Yes	No		
Environmental Concerns	Solid Amalgam Mercury, significantly less volatile and harmful than mercury vapour	Contains mercury vapour- highly volatile and harmful to the environment		

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