

New Induction and Plasma Lighting Technologies proven Superior to LED for Streetlighting and High Lumen Applications

Both Induction lamp and LEP (Light Emitting Plasma) technologies offer significant advantages over LED fixtures for streetlighting and high lumen applications with superior cost savings, longevity and performance

Cities and municipalities across the U.S. are seeking to replace inefficient lighting for streetlighting and public buildings to save energy and reduce operating costs. Similarly, commercial businesses, factories, large retail stores, warehouses, airports, convention centers, and parking facilities are looking to upgrade or replace their lighting systems for energy and maintenance savings. Typically 40% or more of the energy usage for municipalities, businesses and institutions is consumed by lighting. While the popularity of LED lighting increases for many applications, LED is not the best solution when high light levels are needed.

Decline of the Realm of HID Lighting

For decades, applications requiring high light levels have been the realm of high intensity discharge (HID) lighting fixtures. Street and highway lighting, parking lots, bridges & tunnels, stadiums, transportation facilities and other large outdoor areas are typically illuminated with HID fixtures. Warehouses, factories, parking garages, shopping malls, and high ceiling indoor applications also typically use HID lighting. Generally, high pressure sodium (HPS) lamps are utilized for streetlighting and industrial applications due to their efficiency and 24,000 hour life. But HPS exhibits poor color with a yellowish cast. Metal halide lamps, with whiter color rendering are used for most HID applications, but possess shorter lamp life, usually around 10,000 hours. All HID lamps employ an electrode to ignite gasses contained within the bulb envelope, and require a ballast for start-up and voltage regulation. HID lamps require minutes to achieve full illumination after energized, and after power interruption.

Today's Needs Require New Technologies

Major changes are rapidly taking place in the world of commercial lighting. Revolutionary new lighting technologies are impacting the traditional realm of HID lighting systems. The clear advantages of these new light sources represent the future of lighting, and relegate HID lamps as inefficient, fragile and antiquated. Major consumers now require light sources that perform more efficiently, save on energy costs, reduce long term maintenance costs, can be easily controlled, are more durable, provide better color, reduce hazardous waste, and reduce carbon emissions to help protect the environment.

The LED Evolution

LED (Light Emitting Diode) is a solid state, semiconductor technology originally introduced in the 1960's. Compared to conventional light sources, LED provides many advantages, including less energy consumption, longer life, smaller size, faster switching, color changing capability, greater durability and reliability. As a result, LEDs are most suitable and successful for instrumentation, signage, automotive, aviation, decorative, television, computer and emergency lighting. Recent new developments of high efficiency and high power LEDs have created the growth of LED luminaires as viable alternatives to HID fixtures in streetlighting, parking garage, and architectural outdoor and indoor applications.

The downside to the use of LED luminaires in these high lumen applications includes many significant disadvantages. First is high cost. LED fixtures can cost 3 to 10 times more than equivalent fixtures using other light sources. Although very small, many LEDs are needed in a single luminaire to produce the light output required for these applications, thus making for a very expensive fixture. Life cycle performance is an important consideration. LEDs in general are very sensitive to heat degradation and line voltage surges. This can contribute to premature failure if the fixture is not properly designed and engineered. Lumen depreciation is an important factor when considering the new lighting equipment purchase. Most commercial LED luminaires are rated for 50,000 hour life, but their light output drops off after only 10,000 hours of operation, and degrades a significant 20% after 20,000 hours. Replaceability is another serious issue, considering after the roughly 5 or 6 years of useful service operation, the LED luminaire essentially becomes an expensive “throwaway” fixture. Unless the design incorporates easily replaceable LED modules and drivers, the fixture cannot be maintained like other luminaires with convenient lamp and ballast replacement.

Glare is an inherent characteristic of LED lighting due to the fact that an LED chip emits light in a directional pattern that is difficult to disperse, as opposed to a spherical distribution from a lamp. Excessive glare is a safety hazard for occupants, pedestrians and drivers. High power LEDs produce color rendering with high levels of blue light, above the 5000 degree Kelvin range. The International Dark Sky Association asserts the color of these LEDs is more harmful than any other outdoor light source in contributing to light pollution, and also causes disruption to circadian patterns affecting both humans and wildlife. While promoted as a “green” environmentally friendly light source with no mercury content, the LED manufacturing process involves highly toxic substances. After their useful life, disposal of LEDs poses an ecological problem as LED circuit boards contain hazardous materials difficult to recycle.

The Induction Lamp Revolution

Induction lamp technology is rapidly gaining success as the best choice for high lumen applications such as streetlighting, high ceilings, difficult to access installations, and applications with long operating hours. Featuring extraordinary 100,000 hour lamp life, Induction provides 3 to 10 times the service life versus HID lighting and twice that of LED. Induction delivers 50% energy savings using half the wattage of HID lamps, high 85 lumens per watt efficiency, minimal lamp lumen depreciation with 88% light output maintained over the life of the system, excellent 90 CRI color, instant on performance, no restrike delay, and cold temperature operation down to minus 40 degrees C/F. Induction features electrodeless lamps, and the absence of electrodes (filaments) is the reason for their exceptional longevity, durability and vibration resistance.

Induction technology uses an electrodeless fluorescent-type lamp powered by high frequency electromagnetic energy from an electronic generator. External Induction lamps incorporate electromagnets wrapped around the exterior of the glass tube. High frequency energy is sent from the generator to create a strong electromagnet called an inductor. The inductor produces a magnetic field which excites mercury atoms from the amalgam inside the lamp tube. The mercury atoms emit UV light which is converted to visible light by the phosphor coating on the inside of the glass, similar to fluorescent lighting. Due to the unique formulas used, Induction provides far superior color and is available in a range of warm to cool (3500 to 5000 degrees Kelvin) color temperatures. Induction lamps are produced in elliptical, circline and spherical bulb type shapes to accommodate a wide range of outdoor and indoor fixture housings and reflector systems. Environmentally friendly, Induction lamps use less energy and less mercury per hour of operation than conventional lighting due to their long lifespan, and the solid form mercury is easily recycled at end-of-life.

Although commercially available since 1990, Induction technology is derived from the electrodeless lamp inventions by the famous scientist Nikola Tesla in the 1890's. While competing with the new filament incandescent lamp which became the world standard at the turn of the century, Mr. Tesla's quote rings true today: "the filament . . . will be superceded by the electrodeless vacuum tube . . . (a) lamp much more economical and yielding a light of indescribable beauty and softness."

Since its commercial introduction, Induction lighting has become more cost competitive with increased volume and market penetration. While more expensive than comparable HID fixtures, Induction luminaires are typically priced 3 to 10 times less than equivalent LED fixtures. After factoring initial equipment purchase, 100,000 hour life, 50% energy savings, and the savings of 3 to 10 relamping cycles, Induction provides the best value for the investment and fastest return on investment.

Plasma Leads the New Wave of Technology

Plasma, officially known as LEP (Lighting Emitting Plasma) is a newer technology that offers equally impressive capabilities for large outdoor areas and high ceiling applications. Plasma delivers 50% energy savings over HID, efficiency as high as 115 lumens per watt at the source, exceptional color - rated as high as 95 CRI, and 50,000 hour lamp life. Plasma is best described as a Solid State High Intensity light source, and combines many of the best attributes of Induction, LED and metal halide sources. A Plasma luminaire utilizes a single, very small electrodeless quartz lamp and a solid state power amplifier (driver). The driver generates RF (radio frequency) energy to create the plasma light source with a tremendous 23,000 lumens of brilliant white light with beautiful color as high as 95 CRI. This lumen output from a single small lamp far exceeds a typical LED luminaire that requires numerous light emitting sources. Like Induction, the Plasma lamp has no electrodes to wear out. However, the Plasma lamp is a point source like LED, emitting light in a forward direction. This forward distribution and very small lamp size allows the design of more compact luminaires with more efficient optics, without light being trapped in the fixture due to large lamp size. Like metal halide, the Plasma lamp uses similar materials to ionize gasses and form a bright plasma. Superior to metal halide, Plasma is powered with solid state electronics for better reliability and control, produces a continuous color spectrum with high CRI, operates in any orientation, dims instantly down to 20%, and turns on full bright in seconds, not minutes.

Providing the Best Lighting Solutions

"After extensive research and testing in collaboration with our lamp manufacturer partners, we have determined Induction and Plasma technologies are the future for high intensity lighting applications" said Sam Sinai, Vice President of Deco Lighting. "Their advantages far surpass other available light sources. Even more efficiency and energy savings will be achieved as breakthrough control capabilities are combined with Induction and Plasma lighting systems."

Entrenched in conventional and traditional manufacturing and production, the large major lighting conglomerates have been slow to respond to meet today's needs for green technology lighting. "Our key priority at Deco Lighting is to educate the specifier, the commercial and municipal consumer, and the distributor about the latest technology lighting solutions. With our energy and payback analysis, and the comprehensive product line we offer, our goal is to have the customer make the best decision for their lighting investment." added Mr. Sinai.

Deco Lighting is a leading manufacturer changing the world of lighting with the latest green technology, energy saving lighting and controls. Deco Lighting products are proven in commercial, retail, municipal, school & university, military and government installations throughout the U.S. and worldwide. Deco Lighting's extensive product line includes architectural and commercial fluorescent, Induction, Plasma, HID, LED, Solar, Dark Sky friendly outdoor luminaires, emergency fixtures and sensors. For more information visit www.getdeco.com, e-mail: info@getdeco.com, phone 310-366-6866.