Considerations for Evaluating High Intensity LED Lighting

A Buyer's Primer

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LED Lighting represents tremendous opportunities for organizations to dramatically reduce Operating Expenses, Maintenance Expenses, and negative environmental consequences. Before we make a final implementation decision, anything we can do to extend their useful life and receive maximum performance will result in significant financial advantage.

Extending Useful Life:

LED lamp assemblies have two enemies that diminish their lives, hot operating environments and current, especially voltage variations. Ask these questions about the proposed assembly's current management capabilities:

- Is current managed to each individual LED? How? Current accuracy must be no less than +/- 3%. Current fluctuations, such as low or inconsistent voltage cause wear on LEDs and LED Drivers. LEDs connected in serial will be damaged if any LED in the string experiences complete or partial failure.
- Is there an under voltage lockout to protect the LEDs in the event of voltage drops?
- Is there an over voltage lockout to protect the LEDs in the event of voltage surge?
- Is the Driver life extendable with a soft start option?
- Can the user select the current consumption, so that only the necessary current is consumed for the application?

Ask these questions about thermal management:

- What is the LED junction temperature for the LEDs in the assembly? The cooler the junction temperature, the longer the LED component will operate efficiently.
- Does the assembly use over-temperature lockout? This is especially important in hot climates, in summer, when control switches fail and the lights are illuminated during the day.
- Does the assembly offer a resume operation feature to recover from temp lockout, when acceptable operating temperatures are achieved?
- Evaluate the efficacy of cooling capabilities. For example, specify a 25 degree C (77 degree F) operating environment, and ask for slug temperature and heat sink casting temperature in an enclosed fixture. These values should be less than 55 degrees C (131 degrees F)

Maximum Performance:

While LED assemblies are known to deliver significant operating cost advantages, not all products are created equal. To get the most value from your purchase, ask these questions:

- Evaluate the light efficacy, expressed in lumens per watt. Lumen output is a major consideration, but consider watts input in order to generate any given level of lumen output. Highly efficient LEDs and components will be used in the most efficient assemblies, and demonstrate better overall quality.
- Can I select from a variety of configurations to optimize energy consumption for the lighting task that I have? Can I select different operating consumption levels on the individual products?
- Is the device capable of wireless and/or wired communication with control systems that support time-of-day control? Occupancy sensing, daylight harvesting?
- Can the device be programmed for lower energy consumption in off-peak hours?
- Does the Driver supply constant current? At what temperatures does it operate reliably? What is the minimum efficiency of the Driver?
- Does the device rated power consumption include all related overhead power consumption, including the Driver?
- What is the output and input frequency of the assembly? Output frequency should be greater than or equal to 120 Hz to avoid visible flicker. Input operating frequency should be 60 Hz to avoid interference.
- What is the color rendering index? Higher CRIs are a sign of higher quality LED components. A good benchmark is 80.
- What is the product Warranty? How is warranty failure defined? For example, some manufacturers define a warranty failure as light output less than 70% or the rated specification. Others acknowledge the failure of only one LED chip as a warranty failure. Ask if extended warranties are available.