

STERNBERG LIGHTING

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Traditional & Architectural Lighting Luminaires, Poles, Bollards, Site Amenities and Landscape Furnishings
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LED Terminology in Plain English

Paul Mitchell – Sternberg Lighting

Junction Temperature (T_j)

The critical thermal measurement of a diode's operating temperature. This largely determines the life of the LED, the amount of light the LED produces, and the color stability of the output over time.

Lumen Maintenance (L₇₀)

The amount of time it takes for a fixture's lumen output to decrease by 30% from its initial lumen output. The L₇₀ threshold was established by the DOE because in general lighting applications, the typical human eye does not detect the decrease in light until it exceeds 30%.

Downward Delivered Lumens

The amount of usable light emitted from a fixture that actually reaches the ground. This is separate from the rest of the light being emitted from the fixture that goes outward and/or upward. This measurement is more relevant than total lamp lumens or total fixture lumens.

HID – High Intensity Discharge

This refers to Metal Halide (MH) and High Pressure Sodium (HPS) lamps. MH lamps produce a white light, whereas HPS lamps produce a peach/orange color.

CCT – Correlated Color Temperature

A measurement of the visual color produced by a light source. LEDs in the 6000K CCT range produce a more bluish-white color. LEDs in the 4500K CCT range produce a white light virtually identical to that of Metal Halide. LEDs in the 3500K CCT range have a color more similar to incandescent lamps. What's important to note is that higher color temps produce higher efficacy.

Efficacy (Lumens per Watt)

The number of lumens produced by the light source or fixture, versus the amount of wattage required to operate that light source or fixture.

CRI – Color Rendering Index

A measurement of how accurately the color of objects appears to us under different lighting conditions. Natural sunlight has a value of 100, in which all colors appear as they should. HPS lighting generally produces CRI of around 21 which is why everything is color shifted and somewhat "washed out". White light, such as LED, Metal Halide and Induction lighting, generally produces a CRI in the range of 75-80.

IESNA LM-79-08: Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

The guidelines by which we have shifted from relative photometry to absolute photometry.

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IESNA LM-80-08: Approved Method for Measuring Lumen Maintenance of LED Light Sources
The guidelines by which LED manufacturers perform the testing that yields their life rating data.

DOE CALiPer: Commercially Available LED Product Evaluation and Reporting
“Consumer Watchdog” program by the Department of Energy to independently test various LED light fixtures and/or LED systems available to the market, with an initial focus on this that may not live up to their marketing material. For more information:
<http://www1.eere.energy.gov/buildings/ssl/caliper.html>

Concerns with Aftermarket Retrofits

- Manufacturers do not know the specifics of the fixtures these units are going into, including how much air space is in the fixture, how much of the fixture is plastic or glass, and how much is metal.
- In many cases the retrofit unit has no way of removing heat from the fixture.
- Because these are not designed to any specific fixture or style, they tend to have a significant impact the visual appearance of the light fixture, both when lit and non-lit.
- Often there is no LM-79 or LM-80 data available for these units, some of which have already been negatively reviewed by the CALiPER program.
- Because of the above, there are generally questions as to the warranties provided on these products, in terms of both longevity and performance.

Additional Reading

- LEDs Magazine online. A good source to keep current on the technology and various testing as LEDs continue to evolve. Go to: <http://www.ledsmagazine.com>
- ASSIST: Alliance for Solid-State Illumination Systems and Technologies. Another good source from the Lighting Research Center. Go to: <http://www.lrc.rpi.edu/programs/solidState/ASSIST/index.asp>

Remember that LEDs are not just another white light source, but a technology that is completely different from HID light sources. The thermal dependence of LEDs is of the utmost importance, and if properly addressed and controlled, these lights can provide very efficient light output for decades with little to no maintenance while reducing current energy consumption by upwards of 50%.