ASSIST recommends...

Metric for Evaluating Outdoor Luminaires

Outdoor areas present a new option for white LED illumination. Commercial property owners and municipalities are investigating replacing existing parking lot and roadway lighting (traditionally high-pressure sodium or metal halide) with LEDs for their energy savings and reduced maintenance. The problem, however, is how to appropriately evaluate not just parking lot lighting luminaires, but parking lot lighting as a whole.

The Alliance for Solid-State Illumination Systems and Technologies (ASSIST) has developed an evaluation metric for parking lot luminaires, based upon the concept of *application efficacy* and using existing IESNA standards and luminaire classifications for parking lot and roadway lighting. This metric allows the users to select luminaires that will provide the required light levels on the task for the application while demanding the lowest power.

The Metric Defined

The *Luminaire System Application Efficacy* (LSAE) method is calculated for a given luminaire using inputs for the defined task area, the useful luminous flux reaching that task area, and the input power to the luminaire.

$$LSAE = \Phi_{task} \div P$$

Task Area: Defined by the luminaire's IESNA lateral and vertical distributions (e.g., Type III Medium) and the mounting height (e.g., 30 ft.). A grid is drawn within the task area, and illuminance is measured in each grid cell.

Useful Illuminance: The illuminance measured on the grid cells that falls within the requirements for illuminance and uniformity (e.g., 0.2 fc min., 20:1 max-to-min uniformity ratio) standard set by the IESNA.

ASSIST Sponsors

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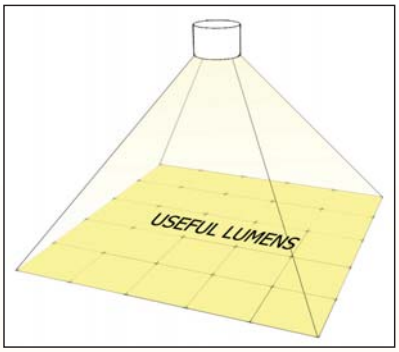
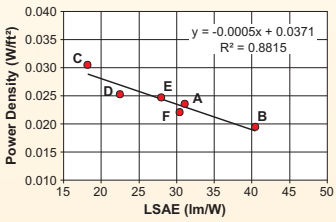


Useful lumens: Flux used for illuminating the task area.

Metric Validation

Analyses were conducted showing the ability of ASSIST's parking lot evaluation metric to:

- Compare single luminaires of the same distribution type (e.g., Type III Medium) to understand how different luminaires with similar or different light sources perform.
- Extend the LSAE value of a single luminaire to different configurations (e.g., multiple luminaires on a pole) or an entire application (e.g., multiple poles); the LSAE value changes as a function of the number of luminaires, but the rank order remains the same
- Predict energy savings and ability to meet IESNA recommendations for the application



Lighting power density (W/ft²) as a function of LSAE for six commercial luminaires, showing correlation between higher LSAE and lower W/ft².

Free Download & Calculator

Details about the metric and a free online calculator are available at:

www.lrc.rpi.edu/programs/solidstate/assist/recommends.asp

ASSIST Program
www.lrc.rpi.edu/programs/solidstate/assist

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