ASSIST *recommends…*

LEDs for Decorative Luminaires

The Alliance for Solid-State Illumination Systems and Technologies (ASSIST) published new test methods in 2008 as part of the **ASSIST** *recommends…* series. The new volume provides recommended test methods and measurement procedures for LED light engines and LED integrated lamps used in decorative lighting luminaires, including table and floor lamps, chandeliers, pendants and wall sconces.

Estimating performance

The goal is to provide luminaire manufacturers with a method of estimating the performance of fully assembled LED light engines, which may include one or more LEDs, heat sink, driver, and other optical, thermal, and electrical components.

For reasons of simplicity and cost, manufacturers may use the same LED light engine in a family of complementary decorative luminaires with different designs and installation environments.

Heat is a critical factor in LED performance, and the amount of accumulated heat can vary greatly from one luminaire to another depending on the design and installation. Therefore, a given light engine may perform differently inside different luminaires. ASSIST's proposed method provides a performance estimate that accounts for these potential differences in the thermal environment.

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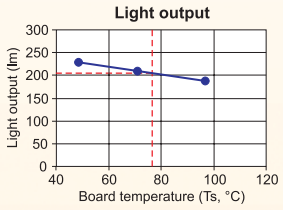
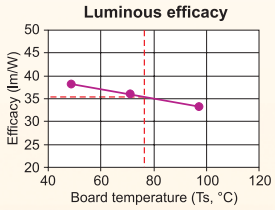
Method explained

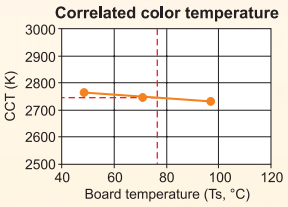
The test method calls for characterizing the LED engine's performance as a function of LED board temperature (Ts). Manufacturers measure Ts and the corresponding photometric and electrical values at three levels of maximum junction temperature (TJmax) to develop a set of baseline data. Luminaire performance is then estimated by measuring the board temperature of the light engine while operating inside a luminaire and through interpolation of this baseline data.

Sample test results

The LRC tested sample commercial LED light engines. The results show that light output and luminous efficacy decrease, and correlated color temperature changes with increases in board temperature.







Test Condition	LED Board Temperature (Ts)
In luminaire	76.6°C
40% TJmax	48.6°C
60% TJmax	70.9°C
80% TJmax	97.0°C

Data for one sample commercial light engine are plotted above. The data points show the performance at each of the three tested board temperatures. The vertical dashed line shows the board temperature measured with the light engine placed inside a decorative pendant luminaire, 76.6°C, and the horizontal dashed line shows the light engine's performance at this temperature.

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