Lighting System Testing and Evaluation

PNNL Lighting Metrology Laboratory (LML)

PNNL maintains a nationally accredited lighting test laboratory and staff expertise to effectively evaluate advanced lighting systems and their applications. Evaluations and technology guidance often do not require testing but do make use of our extensive experience in assessing manufacturers' information and test data. When testing is needed to verify performance, our accredited Lighting Metrology Laboratory offers wide-ranging capabilities to perform photometric, photoelectric, long-term performance, and stress testing.

PHOTOMETRIC – INTEGRATING SPHERE TESTING

Verification of the light output, color, and electrical input of lamps, luminaires, and other lighting products

- Absolute measurement
- Radiant flux (watts)
- Luminous flux (lumens)
- Luminous efficacy (lm/W)
- Chromaticity coordinates
- Correlated color temp (CCT) (K)
- Color rendering index (CRI)
- Current (A) and voltage (V)
- Spectral power distribution (SPD) from 350 nm—850 nm
- Beam/field angle
PHOTOELECTRIC TESTING

Verification of the photometric and electrical characteristics of lighting and other products

» Relative light output, efficacy
» Input power, current
» Flicker (flicker index, percent flicker)
» Start-up operation
» Input power quality (power factor, THD-I)

LONG-TERM PERFORMANCE TESTING

Evaluation of the change over time of the light output and color characteristics of lighting products

Automated relative measurement:

» Radiant flux (watts)
» Luminous FLUX (LUMENS)
» Luminous efficacy (lm/W)
» Chromaticity coordinates
» Correlated color temp (CCT) (K)
» Color rendering index (CRI)
» Current (A) and voltage (V)
» Spectral power distribution (SPD) from 350 nm—850 nm

STRESS TESTING

Evaluation of the robustness of lighting products

» Multi-stress (thermal, humidity, electrical, and vibration)
» Time to catastrophic failure
» Stress level (1–10)
» Time in level
» Parametric degradation
» Measured in between stress levels
» Illuminance, chromaticity (x,y), power quality

ABOUT PNNL

Pacific Northwest National Laboratory, located in southeastern Washington State, is transforming the world through courageous discovery and innovation. PNNL’s science and technology inspires and enables the world to live prosperously, safely, and securely. Our researchers collaborate to advance science and solve complex problems in energy, the environment, and national security—as well as move technology solutions to market. PNNL employs more than 4,000 staff members, with an annual budget of $1 billion. Since 1965, PNNL has been operated by Battelle on behalf of the U.S. Department of Energy.

For more information, contact:
Robert Davis, Sr. Staff Scientist
Todd Samuel, Technical Group Mgr
Energy & Environment Directorate
(503) 417-7572 or (509) 375-6707 | robert.davis@pnnl.gov
todd.samuel@pnnl.gov

Pacific Northwest
NATIONAL LABORATORY
Proudly Operated by Battelle Since 1965