



U.S. Department of Energy
Energy Efficiency and Renewable Energy

SSL Standards Update: Current Status and Issues

CORM 2010
Annual Conference and Business Meeting

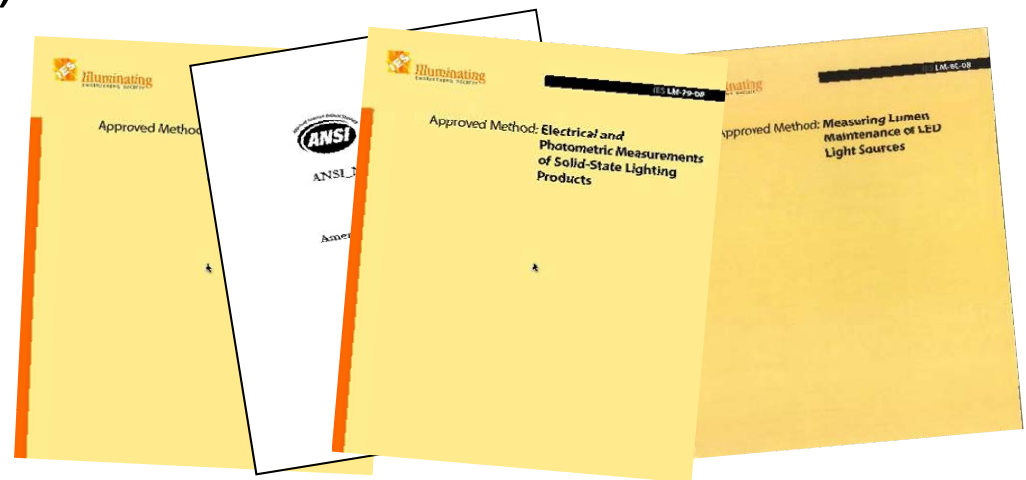
May 9-11, 2010
Las Vegas, NV

Eric Richman
Pacific Northwest National Laboratories
Presented by Michael Grather
Underwriters Laboratories Inc./Luminaire Testing Laboratory Inc.

Completed Standards and Test Methods:

The first 4.....

- C78.377 LED Chromaticity for white light LED
- LM-79 LED Photometric testing (luminaires..)
- RP-16 (Addendum “a”) LED Definitions
- LM-80 LED Lumen Depreciation Testing (packages, modules)



Recent Additions

- UL 8750 LED Safety – available for download
- NEMA LSD 45-2009 Recommendations for Solid-State Lighting Sub-Assembly Interfaces for Luminaires - available for download
- NEMA LSD-49 “Solid State Lighting—Best Practices for Dimming – available for download
- IES RP-16 – Addendum B - additional LED definitions



Other Standards Activity/Progress

- Documents underway:
 - TM-21 - Lifetime extrapolation method (use with LM-80)
 - CIE TC1-69 - Color Quality Scale (new CRI type metric)
 - NEMA SSL-1 - LED Drivers
 - IES LED application Guideline
 - C78.377-2008 (color) – currently in comment collection
 - IEEE Standard P1789 Biological Effects and Health Hazards From Flicker... (in final review)



- **More Underway or in Planning**
 - IES Project S402-10: Methods for the measurements of high power LEDs (in draft development)
 - IES Project S401-10: LED “Light Engine” measurements (PIF for approval)
 - IES AC LED Measurements: Working Group formed
- **Other worldwide organizations also working on mostly parallel documents:**
 - CIE
 - IEC
 - IEEE



ANSLG committee WG review

IEC standards under review by ANSLG WG

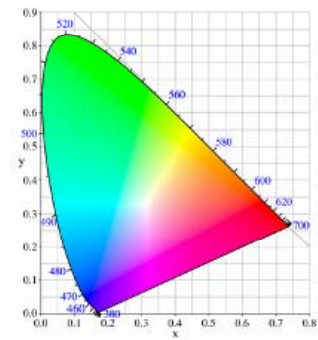
- IEC 62560 ((self-ballasted LED for general lighting (greater than 50 volts); Safety (retrofit)).
- IEC 62612 (LED performance).
- IEC 62031 (LED module).
- IEC 62504 (LED definitions).
- IEC 61345-2-13 (safety specs for ballasted LED).



C78.377-2008 Review Considerations

- IEC looking at standard with higher 2700K bin – not typical for US market or programs
- Confusion with C78.377 (luminaire) vs. diode level tests. Working group formed (T. Stimac)
- NIST proposing study of 2700K issue as part of LED color response study (Y. Ohno)

Review cycle of C78.377 is on hold to consider these issues



LM-79 and LM-80 issues

- LM-79
 - More detail on goniometer measurements
 - AC Power Supply requirements
 - More detail on color uniformity calculations
 - Power Factor reference
 - Others.....
- LM-80
 - Need for more specifics on test parameters
 - Need to revisit limited 6000 hr/1000 data
 - Should continue to explore accelerated test
 - LM-80 needs TM-21 – now!

Speaking of TM-21....

- PNNL working statistical model runs to evaluate decay models
- “X times test hours” life limit likely to be needed
- Conservative estimate from multiple good models likely best method at 6000 hrs
- Clear need for better data than 6000/1000

Other Standards Interests

....from recent ANSLG meeting

- LED package size standardization in support of interconnects – working group formed (R. Weber, T. Stimac)
- End of Life indicator
- Driver reliability

Current Specific DOE support

- NVLAP process workshop
- CALiPER Testing and Standards Roundtable
- NIST lamp standard support
- Uncertainty Budget development subcontract – starting soon
- NIST LED color human response study – soon to be funded

Other needs? Suggestions?



The process still needs your support.....

Current standards and New standards need champions, drivers, *and critical commenters*