

Laboratory training discussion session

Steve Coyne & Jing Wang









CIE TC2-71 CIE Standard on Test Methods for LED Lamps, Luminaires and Modules

Chair: Y. Ohno CIE has worked on this since 2011. The work is basically finished.

TR: To prepare a CIE standard on test methods for photometric and colorimetric performance of LED lamps, LED luminaires, and LED modules in cooperation with CEN TC169 WG7 and IEC TC34.

Worked with CEN TC169 (WG7), producing harmonized standards

CIE S025 Test Method for LED Lamps, LED Luminaires and LED Modules

EN 13032 Lighting Applications — Measurement and presentation of photometric data of lamps and luminaires — Part 4: LED lamps, modules and luminaires

Now final ballot stage, **DIS to be published in Sep. 2014.** CIE/IEC double-logo standard is planned.









Importance of this standard (CIE S 025)

- 1) The EN (CEN) version will be the test method for European regulations for SSL.
- 2) This standard (CIE version) is intended as International test method for SSL products, to be used for **regulations and testing laboratory accreditation for SSL world-wide**.
- 3) This standard (CIE version) will be used by IEC (TC34) as test method for **IEC performance standards on LED lighting products**.
- TC2-71 worked with 40 members from 18 countries

Germany (7), US (5), Japan (4), Belgium (3), China (3), Hungary (2), Netherlands (2), Korea (2), Taiwan (2), UK (2), Austria (1), Australia (1), Canada (1), Switzerland (1), Denmark (1), Finland (1), France (1), Italy (1).





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Important specifications in CIE S 025

Tolerance Intervals for test condition

- Ambient temperature (LED lamps, luminaires)
 - □ 25 °C ± 1.2 °C
- Surface temperature (LED module)
 - \square ± 2.5°C from specified t_p
- □ Air movement
 - less than 0.25 m/s
- Test voltage
 - □ ± 0.4 % from rated supply voltage









Important specifications in CIE S 025

Requirements for instruments

- □ AC power supply
 THD ≤ 1.5% (3 % for high PF products)
- AC power meter bandwidth
 100 kHz or higher
- □ f1' of the photometer head (gonio) and sphere system $\leq 3 \%$









Important specifications in CIE S 025

Requirements for instruments

- Photometric distance of goniophotometers
 - \geq 5 × D (near Lambertian distribution, beam angle >90°)
 - \geq 10 × D (broad distribution, beam angle > 60°)
 - \geq 15 × D (narrow distribution)

(D is the largest dimension of luminaire)









Uncertainty requirements in CIE S 025

Measurement Uncertainties

The uncertainties shall be evaluated according to ISO/IEC Guide 98-3 and its supplements. Guidance is also available from CIE 198.

For all measured quantities the expanded uncertainty shall be given and expressed for a confidence level of 95 %.









Uncertainty requirements in CIE S 025

Measurement Uncertainties

For the purposes of testing, each test report may report uncertainty values for a <u>typical product of the similar type</u> having similar spectral distributions and intensity distributions to the DUT (see NOTE 1)









CIE TC2-71 TG2

Chaired by Y. Ohno

Many manufacturers and testing laboratories have difficulty in uncertainty evaluation, especially for color quantities (chromaticity x, y, u', v', CCT, CRI).

TG2 was established to develop CIE Technical Note "Guide for Practical Uncertainty Evaluation for Testing LED lamps and LED luminaires".









Related CIE meeting coming up

CIE Tutorial and Expert Symposium on Measurement Uncertainties in Photometry and Radiometry for Industry September 11 – 12, 2014, Vienna, Austria

(Tutorial and Symposium)



For further information, visit http://www.cie.co.at

New international measurement standards are being developed by the International Commission on Illumination (CIE). In these standards special emphasis is given to the evaluation of measurement uncertainties.









Future CIE test methods

Another CIE Technical Note under development

Title: Validation of a near-field goniophotometer (Reporter: Roman Dubnicka)

TR: To establish a reportership which will draw up a technical note providing guidance on the validation of near-field goniophotometers for TC2-71 within six months.

Next CIE Test Method standard planned

Test Method for LED packages (based on Technical Reports from TC2-63 and TC2-64)









Uncertainty values

 All uncertainty values of instruments are expressed in expanded uncertainty with a confidence interval of 95 % (typically with a coverage factor *k=2*).









Tolerance & Acceptance Intervals



Figure 1 – Illustration of the tolerance interval and acceptance interval









Example: Ambient Temperature

The set ambient temperature t_{amb} shall be 25 °C for the measurements of LED lamps, LED light engines (designed for ambient temperature) and LED luminaires.

Tolerance interval: ±1,2 °C.

To fulfil this requirement, the result of the temperature measurement shall lie within the acceptance interval.

For example, if the uncertainty of the temperature

measurement is 0,2 °C, the acceptance interval will be ±1,0 °C. If the uncertainty is larger, the acceptance interval will be narrower.

















