



IEC LED Standards

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- Status of IEC LED standards
- Discussion of self-ballasted performance standard as basic quality spec
- IEA 4E solid state lighting annex

LED Types

- Self-ballasted LED lamp



- LED module



- Non-ballasted LED lamp



Self-ballasted LED-lamps for general lighting services $> 50V$

- IEC 62560 - safety specifications
 - New standard – at FDIS stage – publication soon
- IEC PAS 62612 - performance requirements
 - Published 2009 as PAS (fast tracked)
 - Final standard at vote stage (soon)

Self-ballasted LED lamps for general lighting services $< 50\text{ V}$

- Safety specification
 - Early stage DC
- Performance specification:
 - -

LED Modules for General Lighting

- 62031 - Safety specifications
 - First published 2008
 - Amendment due May 2011
- Performance requirements
 - New proposal

Non-ballasted LED Lamps

- IEC 62663-1 - Safety requirements
 - New standard, currently at CD stage
 - Target publication 2012
- IEC 62663-2 - Performance
 - New standard
 - On hold awaiting final draft of LED module performance

Others

- IEC TS 62504 - Definitions for LED and LED modules
 - At vote stage
- 60810 – vehicle lamps performance
 - Provision for LED light sources
- CISPR 15 – radio disturbance
 - Proposal stage
- LED binning
 - New proposal
- LED lifetime prediction
 - Early stage DC

Others

- OLEDs
 - OLED panels for general lightings < 50 V - Safety requirements
 - OLED panels for general lightings < 50 V - Performance requirements
- Tubular retrofit LED lamps
 - Including safety issues
- LED Luminaires
- LED control gear
- LED connectors

IEC PAS 62612 - Self-ballasted LED-lamps for general lighting services > 50V

- Marking: flux, colour, life, etc.
- Dimensions
- Flux limit: $\geq 90\%$ of rated
- Wattage limit: $\leq 115\%$ of rated
- CCT tolerance @ 25% lamp life (max 6000hrs) wrt rated value
- CRI wrt rated value
- Life – based on lumen maintenance L_{50} or L_{70} and ballast test
- Flux measurement – not yet optimised – currently CIE

Lumen Maintenance Categories

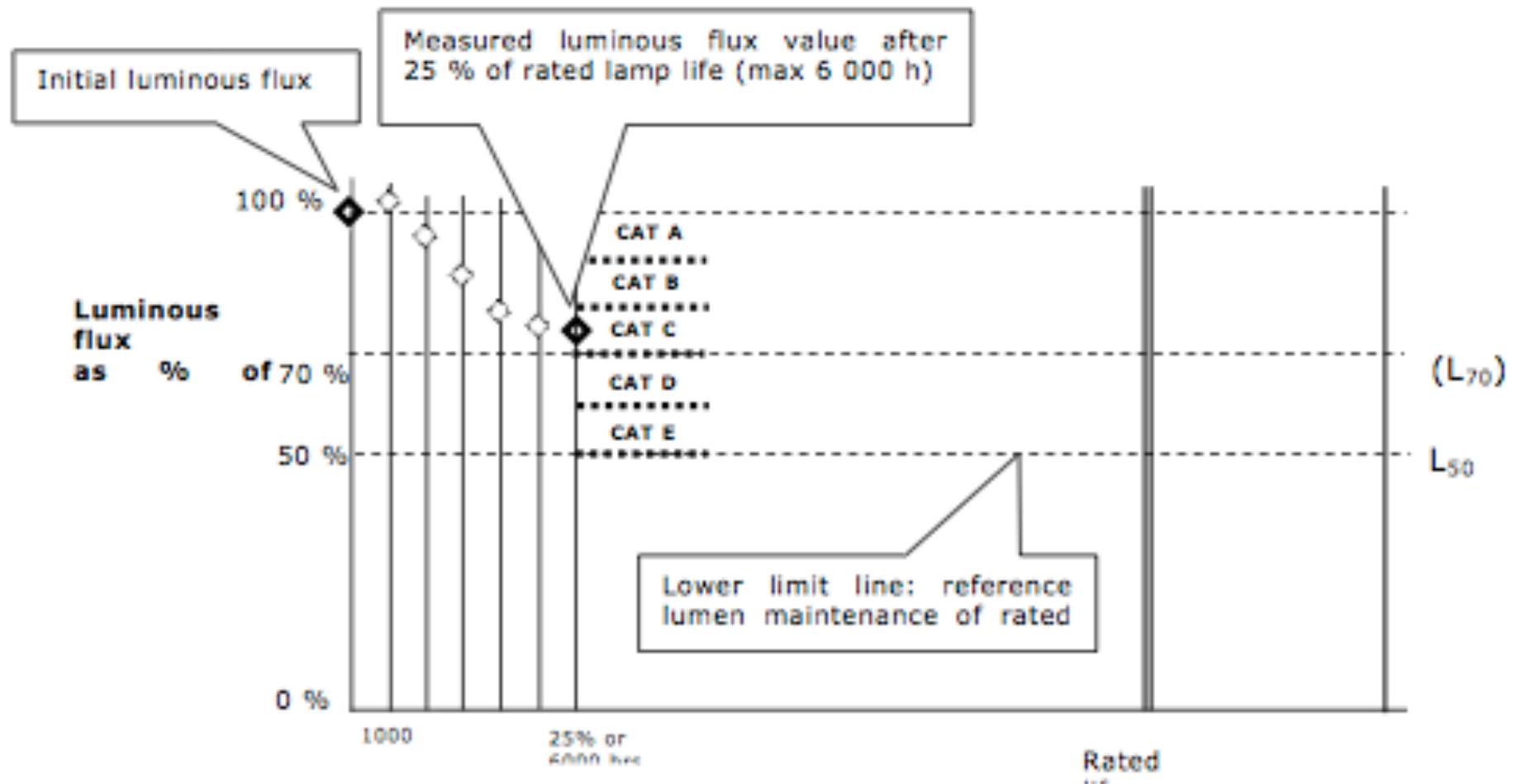


Figure 1 – Luminous flux maintenance over life

Ballast Test (part of life test)

- Temperature cycling shock test (-10°C to $+50^{\circ}\text{C}$)
- Rapid switching test

Discussion

- IEC PAS 62612 as most basic LED lamp standard
- However must measure to 25% lamp life (max 6000hrs)
- Also 62560 (when published) as safety standard

International Energy Organisation (IEA) - 4E Solid State Lighting Annex

- Goal of the annex is to develop simple tools to help governments and consumers world-wide confidently identify which SSL lighting products have the necessary efficiencies and quality levels to quickly and effectively reduce the amount of energy that is currently consumed by artificial lighting.
- First meeting participation by Australia, China, Denmark, France, Japan, USA, Netherlands and Sweden.

IEA 4E SSL cont'd

□ Three Task Groups:

1. Quality Assurance Tools

- Product definition categories
- Key performance characteristics
- Minimum performance values
- Product marks
- Lifecycle analysis
- Equivalency
- 4 Performance tiers

IEA 4E SSL cont'd

- Key performance characteristics consideration:
 - Technical (photometric, energetic, reliability)
 - Economic
 - Maintenance optimisation (repairability, adaptability, cleanability)
 - Commercial purpose (retrofit claims, price, references, warranty, funding + back-to-back scheme)
 - Environmental impact (carbon, recyclability).
- May also consider possible health issues (high luminance blue radiation and possible retinal damage)

IEA 4E SSL Cont'd

2. Protocols for SSL Performance and Campaign of Tests

- Aims to increase the quality and confidence of SSL labs' test results
- **Compile and assess existing test methodology**
- Build a system of testing that is manageable, robust and acceptable to a broad range of stakeholders.
- **Will involve two stages of round robin testing**

IEA 4E SSL Cont'd

- 3. Lab Accreditation + Standardization
 - Investigate existing standards for SSL (compile list of standards)
 - Coordinate with existing accreditation bodies to structure an interim testing lab accreditation method to ensure that SSL performance data and test results can be trusted internationally