CELMA

Federation of National Manufacturers Association for Luminaires and Electrotechnical Components for Luminaires in the European Union

EUROPEAN LAMP COMPANIES FEDERATION

Joint CELMA / ELC LED Forum
Light+Building Fair
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Challenges & Opportunities when introducing a breakthrough technology

James D. Hooker

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Introduction

- Challenges of standardising a breakthrough technology
- Examples of why new standards are required
  - Case Study: Halogen reflector retrofit lamps
- Requirement for new measurement techniques
- ELC:CELMA proposal of what should be standardised
- Conclusion: ELC Published Papers for Lamps / Modules

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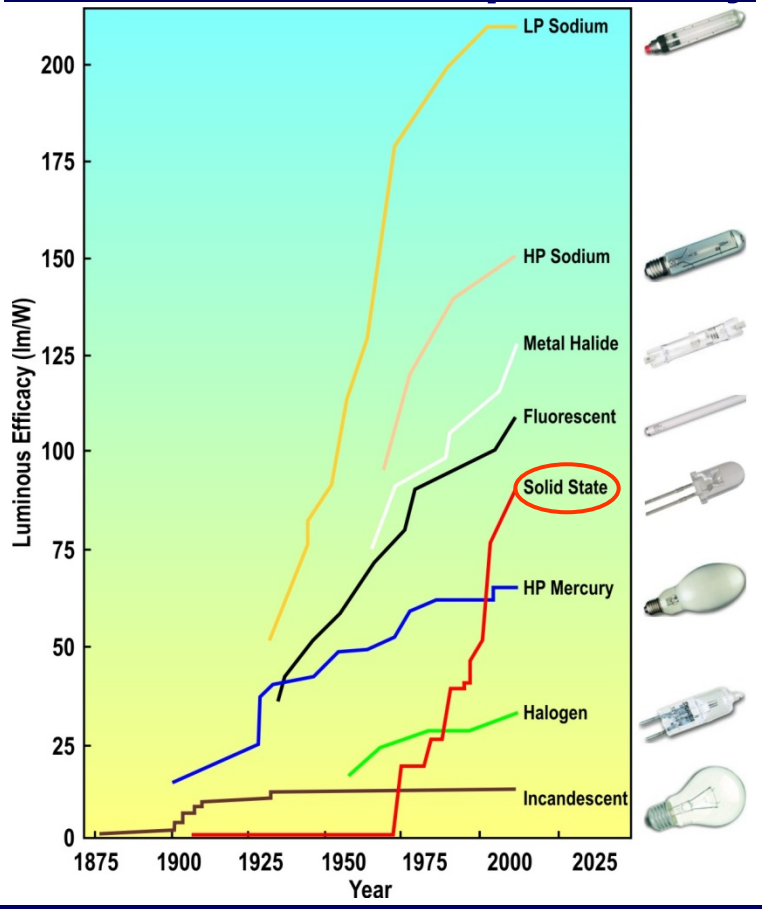
The Origins of the Standardising Dilemma

- Conventional light sources enjoy commercial lifetimes of decades
- Rate of progress is typically slow but steady:
  - *Protracted rate of incremental engineering matches the slow speeds of standardising*
- LED sources are undergoing a remarkably rapid evolution:
  - *Products often obsolete before standardising committees meet!*
- Consequence: we do not have adequate LED standards today!

Evolution of Lamp Efficacy



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How to Address the Standardising Dilemma

- What do we want to standardise?
  - Is it really necessary to standardise the raw LED packages?
  - These are anyway understood by professionals who buy them
  - Standardising the products may hamper future developments
  - Rate of evolution will surpass the speeds of standardising
  - Instead focus on standardising measurement methodologies
- The purpose of standardising is to protect the end consumer who should receive what he is expecting
- Therefore concentrate on what the consumer sees, i.e:
  - Finished Product - LED Lamps
  - Finished Product - LED Modules / Engines
  - Finished Product - LED Luminaires
  - In particular address product safety and performance
  - Standardised colour binning system, e.g. NEMA vs IEC

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Why do we need Standards for LEDs?

- The market is flooded with LED products claiming to replace conventional lamps and luminaires
- Many genuinely achieve this, but most fall far short
  - Example : A product claiming to replace a 50W halogen may typically deliver less light than a 25W halogen!
  - This is damaging the consumer perception of LED in general!
- Lack of standards allows the manufacturers to claim equivalency to whatever they desire
- Limited market surveillance to identify these cases, and lack of standards means they cannot easily act
- Conclusion : Consumer suffers with weak performance
  Impact on rate of LED lamp penetration

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Case Study : GU10 Halogen Retrofits

- Halogen lamps sold by a candela figure for a given beam angle
- Luminous flux is generally not published, for example:

Wattage	Beam	Candelas	Lumens
25 W	25 °	500 cd	125 lm
35 W	25 °	800 cd	200 lm
50 W	25 °	1200 cd	300 lm

- LED is an optically more efficient light source than halogen
- Can achieve similar peak intensities for far fewer lumens!

LED 3.5W	20 °	1200 cd	150 lm

- Can this lamp really be considered as a 50W halogen retrofit?
- The answer is yes, but maybe not in all applications.

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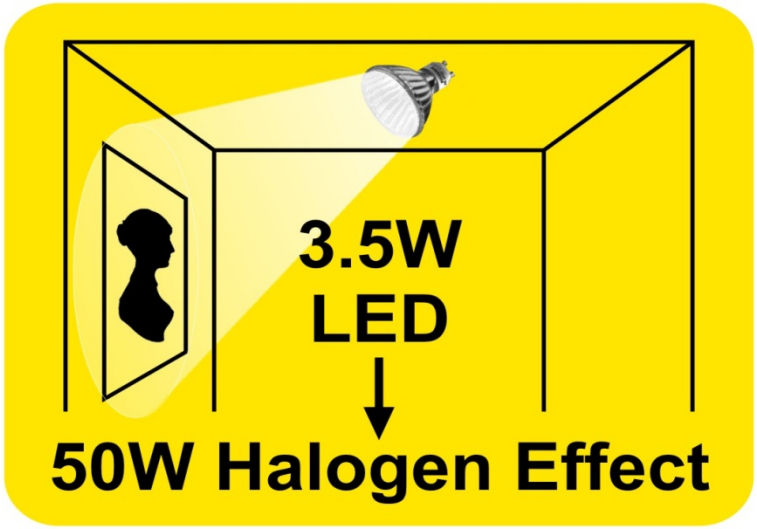
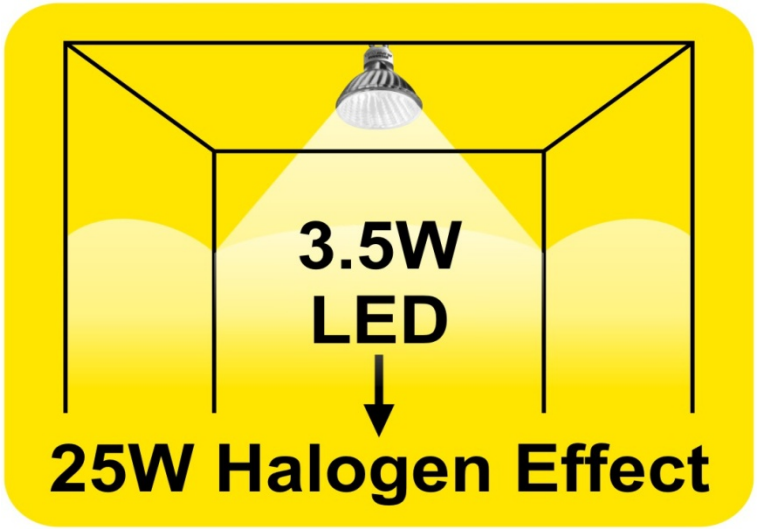
Case Study : GU10 Halogen Retrofits

Equivalency Guide for Accent / Display Lighting



Equivalency Guide for General / Downlighting



- In Accent & Display applications, the Luminous Intensity (cd) must match the halogen original.
- In General & Downlighting applications, it is primarily the luminous flux that is of importance in matching halogen
- Different LED equivalency depending on the application mode!

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How we can Ensure Consumer Satisfaction

- American proposals require LED equivalence to halogen in terms of total luminous flux.
- Bad news for LED, which is optically more efficient than halogen
- Would require more lumens than LED can easily deliver today
- ELC does not believe in copying these technological weaknesses from older generations of lamps
- But we still need to protect the consumer from disappointment in cases where halogens are used in General / Downlighting
- ELC Proposes new measure of "Luminous Flux in a 90° Cone"
  - *Favours lamps having superior optical control and less stray light*
  - *Still enough lumens to meet expectations in general / downlighting*

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ELC Proposals on Directional Lamps

- Performance of common directional lamps in the 90° Cone has been measured by all ELC members
- This value is nearly constant, regardless of beam angle and intensity variations between products
- Proposal to match these values when beam angle is ≥ 20° *(as only wide beam lamps are used for general / downlighting)*
- Proposal to permit scaled reduction in lumens for beams ≤ 20° *(such lamps only being found in accent / display applications)*

Beam Angle Category	NSP 3 - 9°	SP 9 - 15°	NFL 15 - 20°	FL 20 - 30°	WFL 30 - 40°	VWFL 40 - 60°	XWFL > 60°
% Lumens	80%	85%	90%	100%	100%	100%	100%

- This facilitates early adoption of LEDs in narrow-beam accent applications where they can begin saving energy today

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Conclusion

- Various other proposals including:
  - *Minimum lamp lifetimes*
  - *Maximum lumen depreciation*
  - *Minimum colour rendering quality*
  - *Minimum number of switchings*
  - *Minimum power factor*
  - *Maximum early failure rate*
  - *Definitions, including "Halogen Retrofit"*
- ELC actively lobbying EU Commission to embody these recommendations in future EcoDesign Regulation on Directional Lamps
- Eventually join existing IEC standards:
  - *LED Lamp Safety*
  - *LED Lamp Measurement*

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Thank you very much

for your kind attention!

www.celma.org – www.elcfed.org