

**EUROPEAN COMMISSION**

Directorate-General for Communications Networks, Content and Technology

Components and Systems  
**Photonics**

Brussels, 12 February 2013

**M/519 EN**

## **MANDATE ADDRESSED TO CEN, CENELEC AND ETSI TO DEVELOP STANDARDISATION IN THE FIELD OF LIGHT EMITTING DIODES (LEDs)**

### **1. MOTIVATION**

As part of the Digital Agenda for Europe<sup>1</sup> the Commission on 15 December 2011 published a Green Paper entitled "Lighting the Future"<sup>2</sup>, in which it has identified barriers for the uptake of innovative lighting based on light emitting diode (LED) technologies in the European market and proposed measures to speed up the deployment of LED and OLED lighting in the EU. Incomplete standardisation has been identified as a major barrier to a faster take-up of LED-based lighting in the European market and one of the proposed measures is therefore to issue a mandate to European Standardisation Organisations to further develop European standards in the area of LED lighting with view to closing existing gaps, as described below.

This mandate is issued after having consulted the Article 5 Committee under the 98/34/EC Directive in November 2012.

### **2. DESCRIPTION OF THE MANDATED WORK**

The Commission requests CEN, CENELEC and ETSI to address gaps and open areas still to be covered, enhanced, or transposed from international to European level, on the basis of a complete overview of (i) international and European standards and regulations in place for LEDs and (ii) LED lighting related international and European research results and ongoing standardisation activities, that need to be fully taken into account. There is also a need to define adequate measurement and testing methodologies and parameters, which are not yet put in place.

This mandate does not cover development of harmonised standards supporting European Directives on Low Voltage (LVD), Electromagnetic Compatibility (EMC) and Eco-design of Energy-Related Products (ECO-design) or European standards under the General Product Safety Directive (GPSD)<sup>3</sup>. However, it is always up to the relevant

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<sup>1</sup> <https://ec.europa.eu/digital-agenda/>

<sup>2</sup> COM(2011) 889 final

<sup>3</sup> Directives 2006/95/EC (LVD), 2004/108/EC (EMC), 2009/125/EC (Eco-design), 2001/95/EC (GPSD)

European standardisation organisation to decide, if a European standard covering issues related to this mandate also covers issues under other mandates and related to e.g. Directives mentioned above. In such a case there shall be a clear distinction between clauses supporting this mandate and clauses supporting other mandates.

**Key areas where new or enhanced performance standards are required include:**

- **LED luminaire lifetime:** There is currently no metric for LED/OLED system lifetime or standard methods for evaluating/predicting LED luminaire lifetimes. At present, the industry is using “incorrectly” the LM-80 lumen maintenance standard to state lifetimes of LED luminaires but this standard only predicts single LED emitter lumen depreciation and this is only one factor in a complex lifetime issue. This standard should also look to define the actual end-of-life of LED luminaires as there are no definitions (or if there is e.g. L70<sup>4</sup> then this can be overcome with constant lumen electronic systems which reduce overall system efficacy). This standard should initially provide a means of confirming manufacturers' declared data for 25 % of product life with a maximum of 6000 hours and at future time cover further reliability testing and full lifetime reliability.
- There is no **standard definition for acceptable colour shift or power consumption over the lifetime of an LED luminaire.** This means that when a consumer purchases an LED product he/she does not know what variances should be expected over the lifetime of the product. This is less of an issue with traditional lamps such as CFL as most of them only still last a few thousand hours and as such can be replaced; however with LEDs offering the potential for up to 10-20 times that lifetime there needs to be some metrics to define changes in acceptable characteristics. This standard should also initially provide a means of confirming manufacturers' claims of colour up to 25 % of life characteristics with maximum of 6000 hours and at future time cover the full lifetime reliability.
- **Enhanced quality of light metric definitions:** Currently the lighting industry uses colour rendering index (CRI) as a means of quality but this is not appropriate for all light sources and although the Color Quality Scale (CQS) initiative is being reviewed by the CIE it has not become a standard. Therefore, a new standard needs to be developed which also discusses how lighting can be addressed for different environments such as outdoor lighting and can be compared with older lamp technologies. For example, LED lighting has been shown in some US studies to offer the potential to reduce the actual luminous flux for street lighting by up to 40 % of some high pressure sodium and metal halide lamp solutions due to the favourable power spectral densities (PSD) of LEDs. Current standards will not allow the reduction of illuminance on the road therefore it is not possible to take the advantages of using LEDs with more favourable PSD.
- **Standards for flicker and stroboscopic effects:** The majority of LED lighting systems required high frequency switching electronics for efficient control however there are some serious potential health and usage issues such as the switching frequency, current ripple magnitude and stroboscopic effects. Recent studies in the USA show that humans are able to view ripple current effects up and stroboscopic

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<sup>4</sup> Lumen maintenance of 70%

effects up to 10 000 Hz<sup>5</sup>. Existing standards addressing flicker and stroboscopic effects must be enhanced or new standards need to be developed to cover LED lighting and to make sure the health and safety effects are monitored. Currently, the market has implemented very poor low cost LED control gear that have low frequencies e.g. 100 Hz with ripple currents up to 80 % that could cause health or safety aspects at home or work.

**Light technical standards to be developed or completed:**

- standards on test methods for photometric and colorimetric performance of LED lamps, LED luminaires, and LED modules.
- CEN standard prEN 13032-4 'Lighting Applications — Measurement and presentation of photometric data of lamps and luminaires — Part 4: LED-lamps, modules and luminaires', to be completed.

**Standards should also be developed, completed or transposed for:**

- quality performance requirements for LED components,
- performance for LED lamps with supply voltage greater than 50V, LED modules and luminaires,
- lifetime prediction of LED modules, LED lamps and LED luminaires (see also "LED luminaire lifetime" above). The standard should initially provide a means of confirming manufacturers' claims, including input power, up to 25 % of lifetime with maximum of 6000 hours. This work should then be followed by a standard with requirements to cover the full lifetime reliability claims,
- performance for LED lamps with supply voltage smaller than or equal to 50V,
- performance for double-capped LED lamps (retrofit),
- OLED performance for the OLED luminaire lifetime requirements,
- binning of LED components (luminous flux, forward voltage),
- control gear measurement of energy efficiency,
- interconnections between components and LED device (e.g. LED package, LED array (module), LED lamp, LED light engine) at the LED luminaire and lighting systems level; interoperability of thermal, electrical, photometrical and mechanical interfaces,
- interconnections between components, and LED module control gear and LED module at the LED systems level,
- interoperability between LED lamps, modules, control gear and LED luminaire and lighting systems and energy management systems (including stand alone control devices) in existing and new installations,

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<sup>5</sup> <http://www.lrc.rpi.edu/programs/solidstate/assist/flicker.asp>

- interconnection between LED lighting systems and other lighting systems in indoor and outdoor environments,
- power factor in terms of the distortion and displacement components.
- LED street lighting application performance.

### **3. BODIES TO BE ASSOCIATED**

As appropriate, CEN, CENELEC and ETSI will invite the representative organisations of consumers' interests (ANEC), environmental protection (ECOS), workers (ETUI) and small and medium-size enterprises (NORMAPME) to take part in the standardisation work.

CEN, CENELEC and ETSI are also requested to consult with the European Commission Directorate-General Joint Research Centre in order to explore if the Commission's research institutes dispose of specific competence to support the standardisation work.

### **4. EXECUTION OF THE MANDATE**

This mandate is issued after consulting the Article 5 Committee under 98/34/EC Directive in November 2012.

The European Standardisation Organisations shall inform the Commission within one (1) month after the receipt of this request, if they accept this mandate and of the arrangements to be adopted for the execution of the work.

No later than two (2) months after acceptance of the mandate by the relevant European Standardisation Organisation a detailed work programme together with timetable shall be sent to the Commission. This shall cover also information on co-operation arrangements with interested parties and standardisation organisations.

The European Standardisation Organisations shall report annually on the execution of the work programme until all work items identified in the work programme have been published as European standards or, failing that, as other European standardisation deliverables.

The text of the European standards shall be delivered to the Commission in the three working languages of CEN/CENELEC.