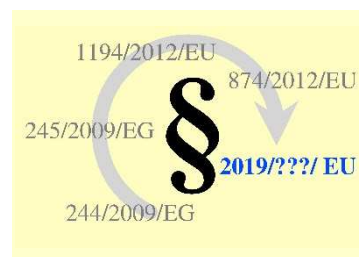


Texte zu den geplanten neuen EU-Regelungen zur umweltgerechten Produktgestaltung und zur Energieverbrauchs-kennzeichnung in der Beleuchtung – Zusammenstellung <sup>[1]</sup> des Umweltbundesamtes (UBA), Deutschland



Entwürfe der EU-Kommission vom 8. Oktober 2018

**Stellungnahme des Herstellerverbandes LE <sup>[2]</sup>**

– Hauptanliegen (19. November 2018) –

*Hinweis: Bitte beachten Sie, daß der angehängte Text nur in Englisch verfaßt ist.*

**EN:** Information on the coming EU Lighting Regulations – Ecodesign and Energy Labelling – Compilation <sup>[1]</sup> of the Federal Environment Agency (UBA), Germany

The EU Commission's drafts of 8 October 2018

**Comments by the Industry Association LE <sup>[2]</sup>**

– Main concerns (19 November 2018) –

**FR:** Informations sur les futures réglementations de l'UE concernant l'éclairage – l'écoconception et l'étiquetage énergétique – Compilation <sup>[1]</sup> de l'Agence Fédérale de l'Environnement (UBA), Allemagne

Les projets de la Commission Européenne du 8 octobre 2018

**Commentaires de l'association de producteurs LE <sup>[2]</sup>**

– Préoccupations principales (19 novembre 2018) –

*Indication : Veuillez noter que le présent texte n'est disponible qu'en anglais.*

<sup>[1]</sup> <https://www.eup-network.de/de/eup-netzwerk-deutschland/offenes-forum-eu-regelungen-beleuchtung/dokumente/texte/>

<sup>[2]</sup> LE = Lighting Europe; <http://www.lightingeurope.org/>

**Texte im Offenen Forum**

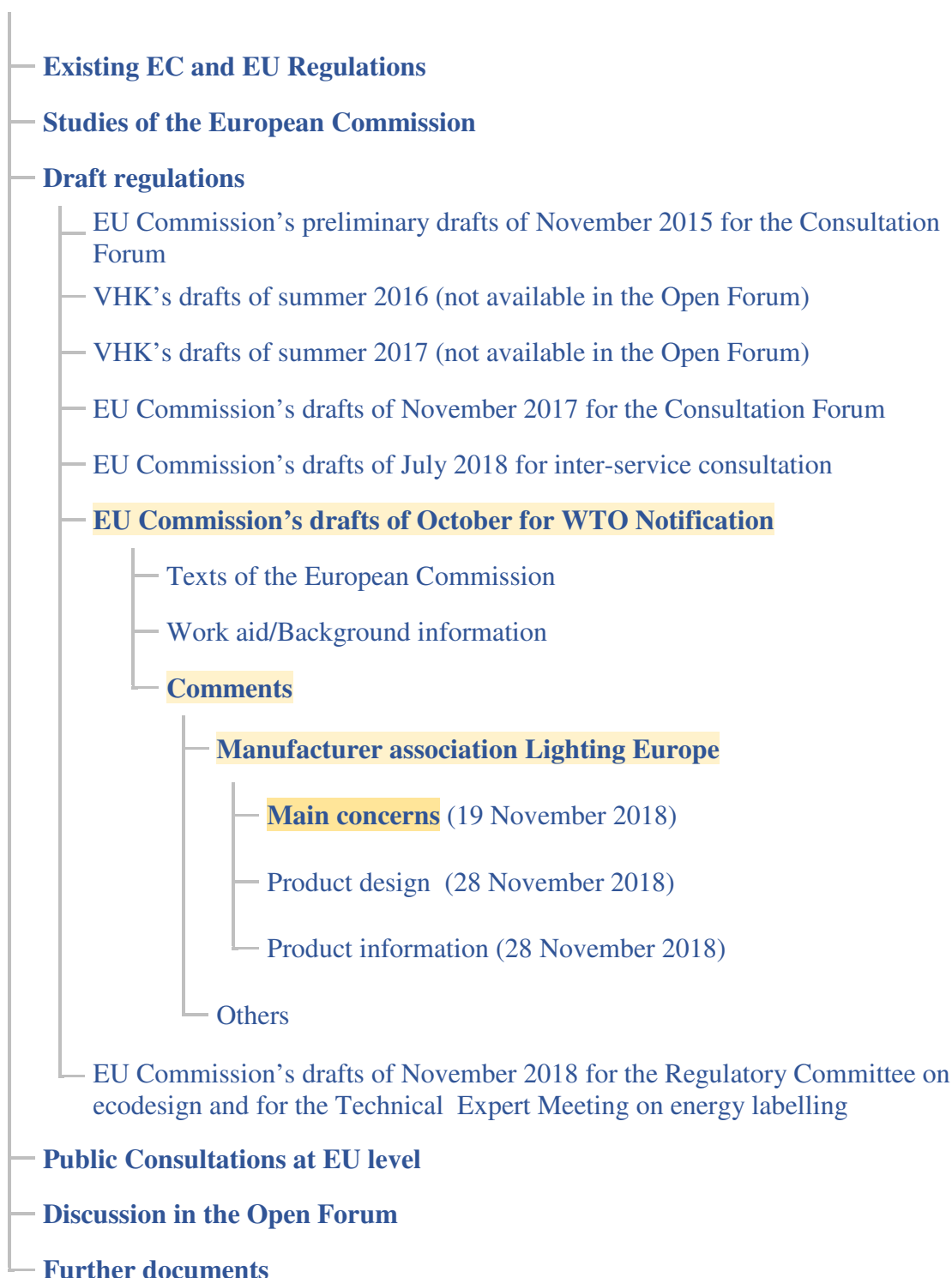
(**abc** = vorliegender Text)

- **Bestehende EG- und EU-Regelungen**
- **Studien der EU-Kommission**
- **Regelungsentwürfe**
  - EK-Vorentwürfe vom November 2015 für das Konsultationsforum
  - VHK-Entwürfe vom Sommer 2016 (nicht im Offenen Forum verfügbar)
  - VHK-Entwürfe vom Sommer 2017 (nicht im Offenen Forum verfügbar)
  - EK-Entwürfe vom November 2017 für das Konsultationsforum
  - EK-Entwürfe vom Juli 2018 für die dienststellenübergreifende Konsultation
  - **EK-Entwürfe vom Oktober 2018 für die WHO-Notifizierung**
    - EK-Texte
    - Arbeitshilfen/Hintergrundtexte
    - **Stellungnahmen**
      - **Herstellerverband Lighting Europe**
        - **Hauptanliegen** (19. November 2018)
        - Produktgestaltung (28. November 2018)
        - Produktinformation (28. November 2018)
      - Andere
  - EK-Entwürfe vom November 2018 für den Regelungsausschuß zur Produktgestaltung und das Fachgespräch zur Produktinformation
- **Öffentliche Konsultationen auf EU-Ebene**
- **Diskussion im Offenen Forum**
- **Weitere Dokumente**

Abkürzungen: • EG = Europäische Gemeinschaft • EU = Europäische Union • EK = EU-Kommission  
• WHO = Welthandelsorganisation • VHK = Van Holsteijn en Kemna, <https://www.vhk.nl/>

## Documents in the Open Forum

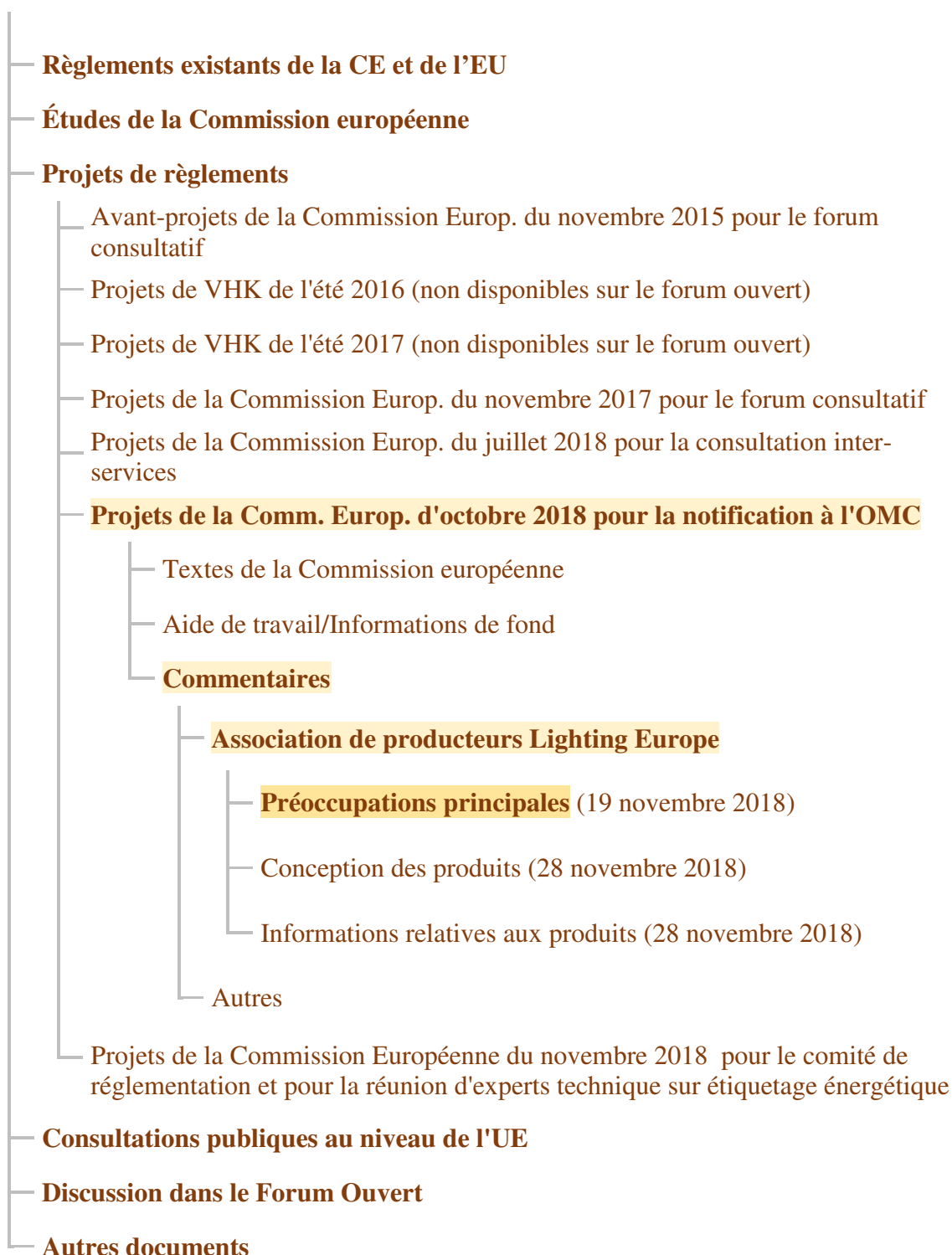
(**abc** = text at hand)



Abbreviations: • EC = European Communities • EU = European Union • WTO = World Trade Organisation  
 • VHK = Van Holsteijn en Kemna, <https://www.vhk.nl/>

## Documents dans le forum ouvert

(abc = présent document)



Abréviations : ● CE = Communauté européenne ● UE = Union européenne ● OMC = Organisation mondiale du commerce ● VHK = Van Holsteijn en Kemna, <https://www.vhk.nl/>

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Es folgt ein unveränderter Originaltext.

**EN:** The following is an unmodified original text.

**FR:** Ce qui suit est un texte original.

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# Main messages

How to strengthen eco-design  
(SLR) and energy labelling  
measures (ELR) for lighting

19 November 2018

*Comments to European Commission's proposal as notified to the WTO on 8 October 2018*

# Content

- **Main messages on eco-design measures for lighting**
- **Main messages on energy labelling measures for lighting**
- **Annex to main messages**



# Main messages

Eco-design measures for  
lighting (Single Lighting  
Regulation)

# Summary | Ecodesign

- **Circular Economy requirements – Removability**

Maintain proposed language – further removability requirements need detailed Impact Assessment

- **Timeline for the phase-out of products**

2021 is too early, further time is needed for a realistic and consistent approach with RoHS

- **The lack of exemptions for some special purpose lamps**

R7s for stage lighting, E27 / R7s for (infrared) heating, exemption of standby requirements for control gear in stage lighting, bonus for LED high luminance light sources

- **Lumen maintenance factor**

Maintain 500 h early failure test OR include UN Model failure test (1,000 h)

- **Luminous Flux**

Increase tolerance for upper limit to 20 %

## SLR | Removability (Art. 4 SLR)

LightingEurope welcomes the European Commission's proposals and recommends Member States to confirm the following approach:

- Light sources and control gear can be removed without being permanently damaged for verification by **market surveillance** – instructions available upon request
- Light sources and control gear can be dismantled at **end of life** – instructions available upon request
- Manufacturers/importers provide **information** on whether light sources and control gear are **replaceable** (free access websites, pictogram on packaging for consumers)
- Commission to undertake **detailed Impact Assessment** before proposing new Circular Economy aspects, taking current regulatory requirements into account

# SLR | Realistic Timeline (1/2)

**Annex II, 1(a) and Table 1:**  
*From 1 September 2021 ...*

	$\eta$ [lm/W]	$L$ [W]
<i>FL T8 other than LFL 2-, 4- and 5-foot (incl. FL T8 U-shaped)</i>	89.7	4.5

## LightingEurope:

LightingEurope and market users request a realistic timeline for the phase-out of these products – 2021 is too early. There are not enough alternatives available. A premature ban will create unnecessary costs and waste.

## Proposal:

Maintain current efficiency requirements and review need for regulation at a later stage

	$\eta$ [lm/W]	$L$ [W]
FL T8 <del>other than LFL 2-, 4- and 5-foot</del> (incl. FL T8 U-shaped)	89.7	4.5

# SLR | Realistic Timeline (2/2)

## Annex II, 1(a) and Table 1:

*From 1 September 2021 ...*

Missing lines for halogen G9, G4, and GY6.35

### LightingEurope:

LightingEurope and market users request a realistic timeline for the phase-out of these products – 2021 is too early. Halogen G9, G4, GY6.35 currently do not have (nor will have in the near future) LED retrofit solution, therefore they should be kept on the market.

### Proposal:

	$\eta$ [lm/W]	L [W]
Halogen lamps with G9, G4, and GY6.35 lamp caps	19.5	7.7

# SLR | Realistic transition timeline

## **Call for a realistic and consistent timetable for transitioning to new lighting technologies**

Joint Industry Statement has been published on 27 March by 18 associations

Main messages to regulators:

- adopt a pragmatic and realistic transition timetable to substitute lighting technologies and products (e.g. linear T8 fluorescent lamps)
- where there are no substitute products and technologies, continue to allow these special purpose products by exempting them from the eco-design and energy labelling requirements

# SLR | Special purpose lamps

- Where no LED replacement is available, the technologies and products need to be exempted
- To avoid loopholes in the exemptions and an unwanted early ban of technologies, LightingEurope welcomes the Commission's proposal of a **detailed list of special purpose lamps** (Annex III – Exemptions)
- This list of exemptions – that due to the huge amount of products and applications could never be definitive and exhaustive – should be regularly revised to take into account 1) relevant applications that were not included in this list and 2) the latest technology improvements

## Proposal:

- Exemption of R7s for stage lighting and infrared E27 / R7s for heating
- Exemption of standby requirements for control gear in stage lighting
- Bonus for LED high luminance light sources

# SLR | Endurance testing

## **Annex II, Table 4:**

*The lumen maintenance factor  $XLMF\%$  after endurance testing according to Annex V shall be at least  $XLMF_{MIN}\%$  calculated as follows:*

*$XLMF_{MIN}\% = 100 * e^{((3000 * \ln(0,7))/L70)}$  where  $L70$  is the declared  $L70B50$  lifetime (in hours)*

*Upper limit for  $XLMF_{MIN}\%$ : the calculated required lumen maintenance of the sample shall not exceed 96.0% (i.e.  $XLMF_{\%} = 96.0\%$ )*

## **LightingEurope:**

Combined with a required testing cycle of 3,600 hours or 21 weeks (!), this very complex formula goes against the starting point as described in Preamble Paragraph 6: aiming for “better regulations” to facilitate better verification, to reduce the number of parameters from compliance testing, and to decrease the time for test procedures

## **Proposal:**

Maintain 500 h early failure test OR include UN Model failure test (1,000 h)



# SLR | Tolerances

## **Annex IV, Table 6:**

Tolerances for various products have been reduced

### **LightingEurope:**

The tolerance for the useful luminous flux, efficacy, CCT should be increased to 10 % regardless of lamp sample size:

- the luminous flux measurement of lamps does have an intrinsic uncertainty of 10 % coming from testing equipment, test procedure and lamp-to-lamp variations
- decreasing the samples number from 20 to 10 could lead to an additional uncertainty of test values, so tolerances should not be further decreased
- survival factor – since we are talking about statistical data, the wording ‘the determined value shall not be less than the declared value’ cannot be interpreted in real life. Keep the 10 % as it is in 245/2009
- The current version does not refer to any harmonised standards concerning the calibration of the verification labs

### **Proposal:**

- Tolerances for Useful Luminous Flux, Efficacy, CCT to be increased from 5 % to 10 %
- Tolerance for upper limit of luminous flux to be increased to 20 %

-5 %

Target value

+5 %

Luminous flux

**To obey the  
lower limit add:**

2.5 % for calibration errors surveillance authorities

3.5 % for calibration errors in light source factory

4 % extra product spread in the used dyes

Devices certainly OK for the lower  
bound of the luminous flux

**Not possible to  
pass both tests at  
the same time with  
legal certainty**

Devices certainly OK for the upper  
bound of the luminous flux

**To obey the  
upper limit add:**

4 % for spread in the used dyes

3.5 % for calibration errors in light source factory

2.5 % for calibration errors surveillance authorities

# Main messages

Energy Labelling Regulation  
for lighting

# Summary | Energy Labelling

- **Scope**

Limit the scope to light sources intended to be removed by the end-user (e.g. lamps) and not marketed as part of a luminaire

- **Formatting**

Enable horizontal full labels and labels in various sizes, and allow full labels in greyscale

- **Relabelling**

Delete requirements or find more reasonable solutions

- **Information requirements**

Limit information requirements to what is necessary for the energy label, as there are too strict and too many irrelevant information requirements

- **EPREL scope and timeline**

Propose a realistic timeline that will enable industry to comply with the database requirements

- **Emergency lighting**

Regulation shall not apply to emergency lighting, as it makes no sense

# ELR | Scope

## Art. 1:

*(...) The requirements also apply to light sources placed on the market in a containing product. (...)*

## LightingEurope:

This implies uneven market conditions following the ELR, because

- too many models have to be uploaded, and this information has to be uploaded in EPREL continuously, resulting in delays in placement on the market of new products
- it implies the obligation to test *all the modules* to assign the energy label
- no useful information given to the end-user, especially for professional use

## Proposal:

- Replace by: “The requirements also apply to light sources placed on the market in a containing product **if intended to be removed by end-users, for example when they are offered for sale, hire or hire purchase, or when they are displayed separately to the end-user.**” (as in Art. 1(2)(d) of Reg. 874/2012)
- Art. 3(1)(a) of the ELR has to be aligned with Annex III, Point 1

# ELR | Formatting

## **Annex III:**

Label for light sources

## **LightingEurope:**

Labels are available in fixed sizes and coloured formats only, which significantly reduces the possibilities to avoid packaging waste for smaller light sources.

## **Proposal:**

As in Reg. 874/2012, maintain the possibilities to print

- A horizontal label
- A greyscale label
- A greyscale arrow
- A label in scalable size (with minimum sizes)
- At clearly indicated position on the packaging

# ELR | Relabelling

## **Art. 3(1)(i):**

*on request of dealers in accordance with Article 4(e), printed labels to rescale products are provided as a sticker, of the same size as the one which is already on the package;*

## **Art. 4(e):**

*existing labels on light sources at points of sale are replaced by the rescaled labels that shall be attached to the packages in such a way as to cover the existing label by nine months from the application of this Regulation.*

## **LightingEurope:**

The requirement for the products already on the market is unfeasible (e.g.: sticker on shelf; opening of boxes of containing products)

## **Proposal:**

Delete requirements, or find more reasonable solutions to give information at the retailer on the pre-existing and the existing energy classes.

# ELR | Information requirements

## **Annexes V and VI:**

Too many details are being asked

## **LightingEurope:**

- The information required is far too much and far too complicated. LightingEurope does not see any reason nor any added value in this. It is only generating a huge administrative burden for the manufacturers and importers without helping the market surveillance authorities. It goes against the aim of having simple and easily enforceable regulations in place.

## **Proposal:**

Further limit to information that is relevant to the energy efficiency label



# ELR | Scope and timeline of EPREL

With the current planning, suppliers will have only **eight** days to comply before the database goes online on 1 January 2019

## **LightingEurope:**

Uploading product information related to **hundreds of thousands lighting product models** is unfeasible in light of the timeline and the state of preparedness of EPREL, while necessary guidelines and infrastructure do not yet exist for suppliers to start registering and uploading information. This may result in involuntary incompliance.

## **Proposal:**

Propose a realistic timeline that allows the industry to comply with EPREL, as eight days is too short, especially for a deadline so soon (1 January 2019)

# ELR | Emergency lighting

Emergency lighting is within the scope of the ELR

## **LightingEurope:**

- Safety product: no added value to characterise energy use, as safety of human lives is primary concern of emergency lighting
- Emergency light sources are powered by independent energy sources (e.g. batteries) that need to be continuously fully charged
- No illumination function when mains is on
- Labelling creates additional complexities and burden for industry with no additional value to users

## **Proposal:**

Exempt emergency lighting from energy labelling requirements

# Annex to main messages

How to strengthen eco-design  
(SLR) and energy labelling  
measures (ELR) for lighting

# Content of annex to main messages

- **Chip-on-Board (CoB)**
- **LED high luminance light sources**
- **Studio, theatre, and architectural lighting**
- **Drivers for entertainment**
- **Halogen R7s for stage and studio**
- **Colourless infrared R7s lamps**
- **Clear infrared E27 heating lamps**

# Annex to main messages

## Chip-on-Board (CoB)

# SLR | Chip-on-Board (CoB)

## Art. 2(1)(8):

*(...) So called Chip-on-Board (CoB) packages, and similar light-emitting devices that are intended to be used directly in an LED luminaire, are not considered to be LED packages, but LED modules;*

## LightingEurope:

- CoB technologies can either be used as a component (package) or to produce a module.
- CoBs that are intended to be used as components are treated as LED packages (not qualified/registered as a “light source” by the manufacturer).
- CoBs that are intended to be used as a “light source” are treated as LED modules (qualified/registered as a light source by the manufacturer)

## Proposal:

(...) ~~‘So called Chip-on-Board (CoB) packages, and similar~~ **any** light-emitting devices ~~s~~ that **are is** intended to be used directly in an LED luminaire, ~~are is~~ not considered to be **an** LED packages, but **an** LED modules’.

# Annex to main messages

LED high luminance light  
sources (LED HLLS)

# SLR | LED high luminance light sources

## Benefits of high luminance light sources (HLLS)

- HLLS are a key element for directional lighting applications (e.g. roadway lighting, stadium lighting, specialised architectural applications) where a very narrow beam, excellent control of spill light and far throw are requirements
- HLLS enable narrower beam angles with smaller optics, resulting in more light delivered on target, energy savings, volume reduction (miniaturisation) and cost savings



# SLR | LED high luminance light sources

## Why HLLS need a bonus

- HLLS have intrinsic efficacy penalties at source level due to:
  - technical disadvantages of high current (> low efficacy)
  - no dome (> low efficacy)
  - no secondary optics (> no benefit from optimised optics)
- The lower source efficacy is due to a combination of efficiency droop in epitaxy, dye and phosphors, and lower light extraction efficiency in a small package
- The intrinsic efficacy penalties are offset at application level by the higher light use efficiency (directing the light where it is needed) enabled by the small source size, yielding a net energy benefit
- A bonus is therefore required to maintain high luminance light sources on the market

# SLR | LED high luminance light sources

## **HLLS do not get multiple bonuses**

HLLS enable the luminaire to be directional and to have a small beam angle

But...

HLLS at LED module level (as long as secondary optics are not included)

- do not get the bonus for directional light sources (DLS)
- are not a small beam angle light source (and hence do not benefit from a potential exemption for small beam angle light sources)

### **Note:**

- The bonus for CTLS is completely independent of the HLLS discussion; only a small part of HLLS are CTLS
- To avoid the combined use of the bonus for HLLS and DLS (e.g. at the luminaire level) a statement could be made that the HLLS and DLS bonuses cannot be used in combination

# SLR | LED high luminance light sources

## Relation between test conditions and bonus

- There is a direct relation between the bonus requirement and the drive current at which the light source is tested
- Testing at a low drive current (less than as used in the application) would reduce the need for a bonus, but would not be representative for how HLLS are used
- HLLS need to be tested at a representative test current
  - With high luminance LEDs the luminance is the main feature, therefore the testing of LEDs is usually close to the maximum allowed current, which leads towards a high reduction of the efficacy. Practically the LEDs are often driven at current below the maximum to increase the efficacy as well as the costs of the required cooling system
  - For Modules with an integrated driver it is not possible to test at a lower drive current than actually used

### **Note:**

Low luminance LEDs are trimmed to have highest efficacy and are therefore tested at lower current with tendency to test at the highest efficacy point of the LEDs. Driving within the application is often above this point, which leads to a reduced efficacy of the LED within the application

# SLR | LED high luminance light sources

## No risk of loopholes

- There is no incentive for “normal LEDs” to strive for the bonus
- There is no incentive to use HLLS in non HLLS applications

Because:

- Normal LEDs are far away from the threshold (high Power LEDs at a typical drive condition normally have a luminous emittance around 50 lm/mm<sup>2</sup>)
- To achieve higher luminance, specific design trade-offs need to be made that penalise efficacy
- HLLS require expensive cooling devices
- HLLS are more expensive LEDs

# SLR | LED high luminance light sources

## Proper coverage of all lumen density range, with C+ bonus for HLLS

- Actual C+ bonus proposal for HLLS is useful but in discrete steps and limited to 90 cd/mm<sup>2</sup>; this corresponds to approx. 282 lm/mm<sup>2</sup> in lambertian emitters
- Technology improvement will allow increasing illuminance above 90 cd/mm<sup>2</sup>
- A proper coverage of entire lm/mm<sup>2</sup> range is proposed, with continuous C+ calculated fitting the table initially proposed and limited up to 100 cd/mm<sup>2</sup> (Above that, required bonus would become too high)

$$C\_HLLS = 0.0058 * \text{Luminance\_HLLS} - 0.0167$$

Luminance_HLLS (cd/mm <sup>2</sup> )	Lambertian emitters (lm/mm <sup>2</sup> )	C_HLLS (discrete step value)	C_HLLS from equation (new proposal)
>30	94	0.15	0.157
>60	188	0.35	0.331
>90	283	0.5	0.505
>100	314	<b>Exempt</b>	<b>Exempt</b>

# SLR | LED high luminance light sources

## LightingEurope proposal

Proposal to be added as definitions in Annex 1:

- “LED high-luminance light source” means a LED light source with an average luminance of the ~~light emitting element(s)~~ greater than 30 cd/mm<sup>2</sup>, ~~with the boundary of each light emitting element defined at 50 % of the peak luminance of the light emitting element(s)~~”
- ‘Luminance’ (candela per square millimetre, cd/mm<sup>2</sup>) is the luminous intensity per unit area of light-emitting surface.
- ‘Average luminance’ for a LED light source means the average luminance over a light-emitting area where the luminance is more than 50% of the peak luminance.

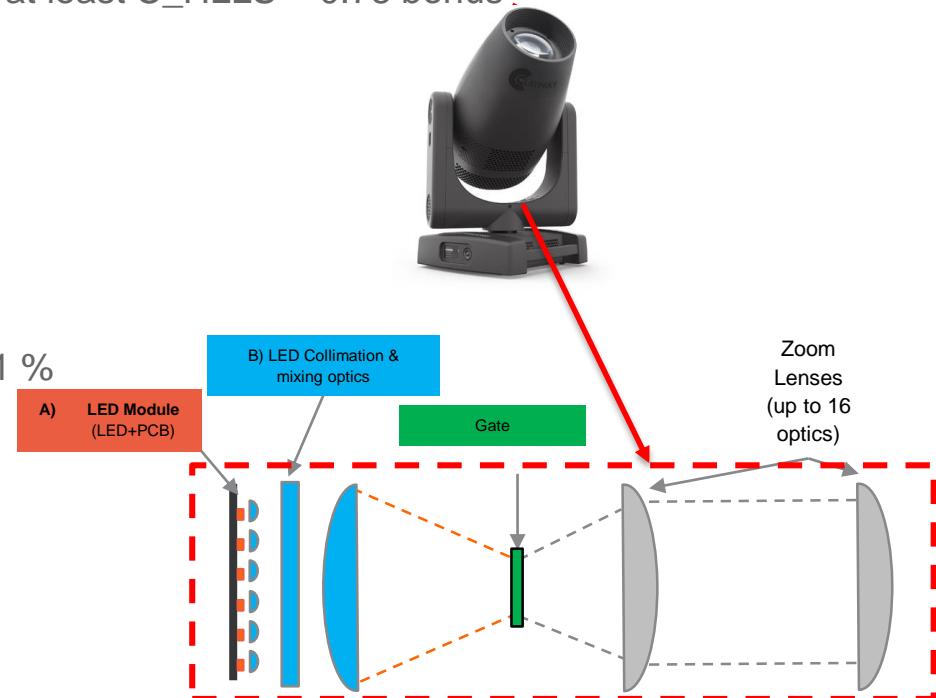
Note: To identify the luminance of HLLS, a new parameter must be defined in the ED regulation, and this parameter must be used to refer to luminance of HLLS

- Bonus for LED HLLS based on continuous equation:  
$$C\_HLLS = 0.0058 * \text{luminance\_HLLS} - 0.0167$$
  
Exemption for light source if  $\text{luminance\_HLLS} > 100 \text{ cd/mm}^2$
- Include statement that LED HLLS bonus cannot be combined with DLS bonus
- Manufacturer has to declare that the product concerned is a LED HLLS, together with documentation (luminance measurement) as support

# SLR | LED high luminance light sources

## HLLS adoption example in entertainment fixture

- **LED Module:**  $\Phi_{\text{use}} = 70 \text{ klm}$ ,  $P_{\text{module}} = 950 \text{ Watt}$ , CRI 70, >100 LEDs of  $1 \times 1 \text{ mm}^2 \rightarrow 118 \text{ cd/mm}^2 \rightarrow$  light source is exempt because exceeding  $100 \text{ cd/mm}^2$
- Light source could fulfil requirements only with at least  $C_{\text{HLLS}} = 0.75$  bonus
  - $P_{\text{onmax}} = C * (L + \Phi_{\text{use}} / (F * \eta)) * R$ 
    - $L = 1.5$
    - $F = 1$  (NDLS)
    - $\eta = 120 \text{ lm/W}$
    - $R = (70 + 80) / 160 = 0.9375$
    - $C = 1 + 0.75$  (for HLLS >110  $\text{cd/mm}^2$ )
    - $P_{\text{onmax}} = 959.5 \text{ W} \rightarrow P_{\text{onmax}} / P_{\text{module}} = 101 \%$



# Annex to main messages

Studio, theatre, and  
architectural lighting



# SLR | Studio, theatre, and architectural lighting

## LightingEurope exemption proposal

*“LED light sources intended to be used and marketed specifically for scene-lighting use in film studios, architectural lighting, TV studios, and photographic studios, or for stage-lighting use in theatres, discos and concerts or other entertainment events, with a declared power consumption  $\geq 100$  W and intended to be used in containing products with a peak luminous intensity more than 50 000 cd.”*

# SLR | Studio, theatre, and architectural lighting

## No risk of loopholes

	VIVID SERIES				BRILLIANT SERIES			
Model #	SM16-09- 25D-927-03	SM16-09- 36D-927-03	SM16-09- 25D-930-03	SM16-09- 36D-930-03	SM16-09- 25D-827-03	SM16-09- 36D-827-03	SM16-09- 25D-830-03	SM16-09- 36D-830-03
CCT (K)	2700	2700	3000	3000	2700	2700	3000	3000
Beam (°)	25	36	25	36	25	36	25	36
<b>CBCP (cd)</b>	<b>2570</b>	<b>1210</b>	<b>2700</b>	<b>1280</b>	<b>3090</b>	<b>1460</b>	<b>3260</b>	<b>1540</b>
Halogen Equivalent	60	60	60	60	75	75	75	75
Total Flux (lm)	465	465	490	490	560	560	590	590
Efficacy (lm/W)	52	52	54	54	62	62	66	66
MacAdams	3	3	3	3	3	3	3	3

Similar values can be seen also in MR16 family datasheet from other suppliers like for instance:

<http://www.lighting.philips.com/main/prof/led-lamps-and-tubes/led-spots/essential-ledspot-mr16>

# Annex to main messages

## Drivers for entertainment

# SLR | Drivers for entertainment

## Exemption for standby power for control gears used in entertainment application

- Control gear for this application is exempted in 1194/2012
- LightingEurope strongly advises to exempt standby power for control gear (above 100 W) used in entertainment application. Essential to enable replacement of control gears in existing installations (HID & LED)

Issues with bringing control gear under this regulation are:

- Control gears in this application do not meet standby requirement of 0.5 W
- Standby requirement is not relevant for this application since luminaires are switched off after the show
- Forcing the industry to redesign luminaires to meet standby requirement is enormous burden due to large diversity of luminaires and corresponding diversity in control gears, while it does not give any significant energy saving



# SLR | Drivers for entertainment

## Proposal for control gear exemption for entertainment application

Unique technical characteristic:

- Entertainment lighting uses DMX/RDM interface for communication
- DMX/RDM interface is not used in general lighting applications
- Light source power is relative high (typically above 100 W for LED)



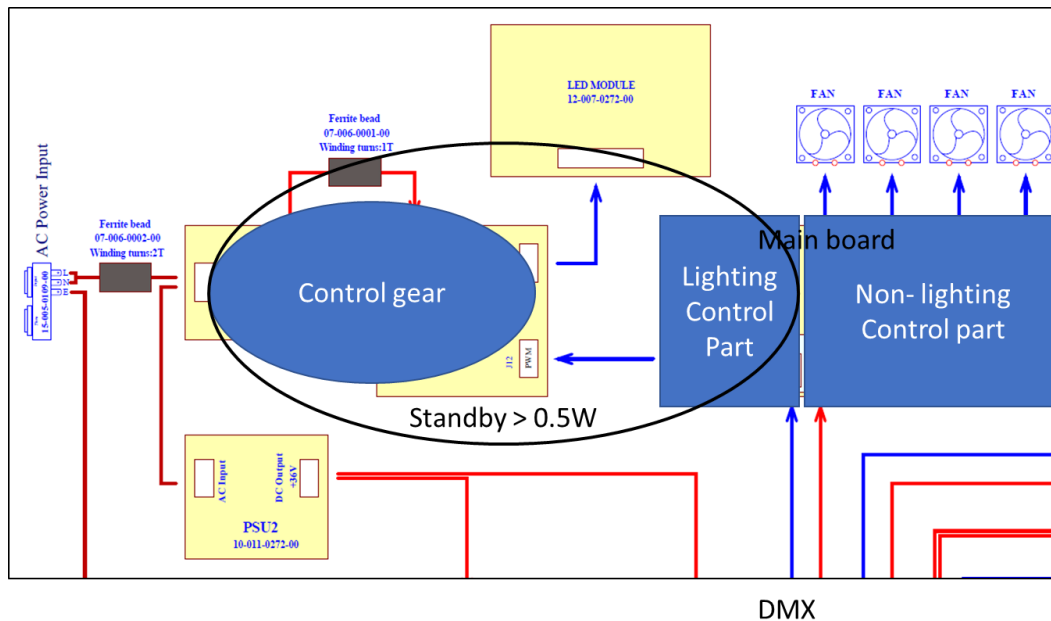
Proposal to exempt the following products :

- Control gear with output powers of at least 100 W having a communication interface based on DMX/RDM communication protocol\*
- Light source of at least 120 W with a communication interface based on DMX/RDM communication protocol\*

*\*) USITT DMX 512 interface according ANSI E1.11 or an RDM interface according ANSI E1.20 with optional additions ANSI E1.37-1 and ANSI E1.37-2*

# SLR | Drivers for entertainment

## Annex 1: example architecture



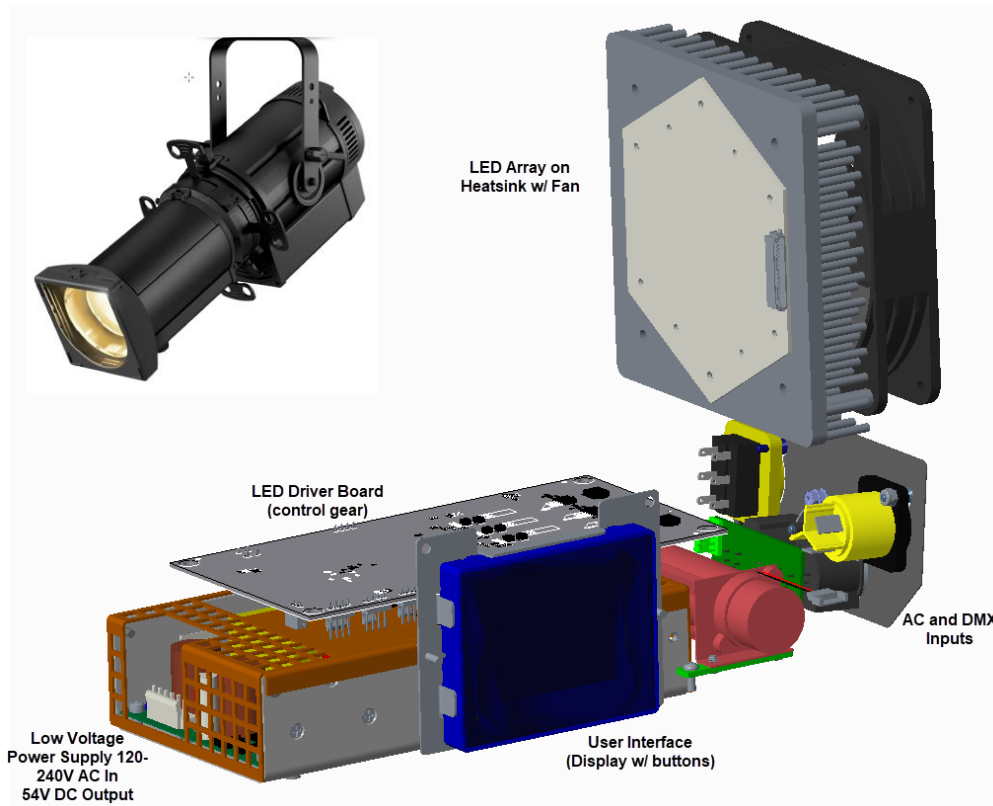
### Main Board controls:

- Light
  - Non-lighting functions
    - Runs fans and monitors fan speeds
    - Controls motors for lenses and objects
    - Display
  - DMX communication (= lighting control part) energy consumption cannot be separated from other functions (all functionality runs in one microprocessor)
  - DMX communication needs to be fast, e.g. needs to be synchronised with music
- Higher data rate communication requires more energy



# SLR | Drivers for entertainment

## Annex 1: example architecture



Why are functions integrated in other way as in general lighting application? (No clear separation between control gear and other functions)

- More functionality requirements beyond lighting (e.g. fans, motor drivers)
- Size restrictions

- Many different solutions on market
- Industry cannot redesign most products before 2021 due to too large variety

Proposed Regulation will result in:

- ban of most of the existing LED luminaires
- lack of spare parts for HID and LED luminaires
- back sliding to old technologies (halogen) until new LED products are available

# Annex to main messages

Halogen R7s for stage and  
studio



# SLR | Halogen R7s for stage and studio

## Halogen light sources with R7s and Rx7s caps for stage & studio lighting

- For stage and studio lighting, high colour rendering (CRI 100), dimmability, spectral power distribution, and high luminosity are equally important; LEDs are not yet fully ready to fulfil all these vital criteria at the same time and there is no LED replacement for these lamps above 100 W
- **Exempt:** halogen light sources with R7s and Rx7s caps for stage & studio, theatre and film/movie applications with efficacy  $\geq 24$  lm/W, luminous flux  $> 12,000$  lm, min. 3,200 K, rated lifetime B50  $\leq 400$  h and fulfilling one of the following criteria:
  - a) Diameter of min. 15 mm; OR
  - b) Overall length other than the standard 78/118 mm; OR
  - c) Lamp nominal voltage 120 V

**No risk of loopholes** because these lamps have a very well-defined application area and the technical parameters that make them special for this purpose are very well-defined as well: high lumen, high CCT, short life time, and either because of their dimensions or their operating voltage they cannot be used in standard industrial or consumer fixtures

# Annex to main messages

Colourless infrared R7s  
lamps

# SLR | Colourless infrared R7s lamps

Heating objects with infrared radiation is very efficient in open space:

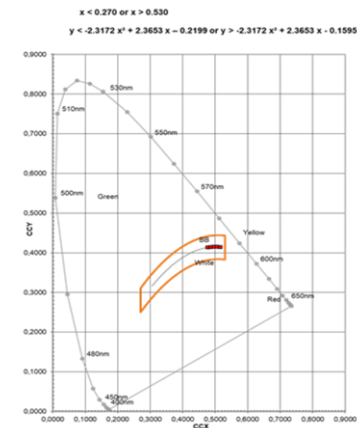
- the conversion of electrical power to radiation is more than 95 % efficient because of the high filament temperature
- the radiation can be focussed from a distance on the object to be heated
- infrared is almost not absorbed in air, so there is little energy loss in the transport

The human eye can be protected from the visible light by a red coating, but it

- reduces the efficiency of the heating by several percent
- it makes the food look unattractive, if used in warming meals
- disturbs living animals if used for young livestock

We propose to introduce the following characterisation and presented on the packaging:

- a filament operating below 2,500 K (typically 1,700 – 2,500 K)
- dimension not corresponding to traditional standards 78/118 mm; or
- multilayer coating or reflector in order to maximize heating power



# Annex to main messages

Clear infrared E27 heating  
lamps

# SLR | Clear infrared E27 heating lamps

Application of clear infrared E27 heating lamps:

- Agriculture, e.g. breeding, veterinary clinics
- Zoos and pet shops
- Food industry and catering, e.g. food displays
- Industrial, e.g. carbonising, melting, drying, etc.

Features

- Typical range: 100 – 375 W reflector lamps; PAR38, BR125, and R125
- Safe, simple, and clean heat sources
- Hard glass construction

Benefits:

- 90 % of energy is transmitted as infrared heat
- Lifetime of 5,000 h and easy installation
- Instant, accurately controllable radiant heat



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