

Proposal for amendment of Annex III.3 point (w)
Commission Regulation on ecodesign, repealing Commission Regulation
(EU) 1194/2012

16 July 2019
Ref.:P7566

Introduction

The aim being to maximise energy savings and close loopholes in current legislation, the reviewed ecodesign regulation has replaced general sector exemptions for special purpose lights used in theatres, concert halls, live venues and film studios by exemptions based on technical characteristics.

The European Entertainment Ecodesign Coalition* - a European-wide group of associations working in the entertainment, lighting design, live performance and film/TV sectors welcomes the outcome of the Regulatory Committee's vote of 17 December 2018. The majority of our concerns regarding stage and studio lighting were addressed by the expert group.

Regrettably, the text contains an inconsistent article in Annex III.3 point (w) parts 1 and 2.

The article deals with the use of very high output light sources and is essential as it allows for the full functioning of professional lighting in our sectors.

We therefore advocate the introduction of an amendment to Annex III.3 point (w) with the aim to return to the initial proposal of the European Entertainment Ecodesign Coalition, made in the run-up of the vote on the ecodesign regulation on 17 December 2018.

If this procedure is not possible, we call on Member States to amend annex III.3 point (w) as proposed in the alternative option 2.

A key component for our sectors are high output LED sources addressed in article (w).

They are used in these contexts:

- adopting positions for different scenes to reduce number of spotlights
- specials (lighting dedicated positions)
- movement effects
- FOH lighting bridges
- toplights
- contre-jour lights
- film lighting

LED sources are recognised as the way forward to reduce energy consumption.

However, due to technical and physical effects described in detail below, high output LED sources used for stage and studio lighting are unable to meet the efficacy requirements set out in the revised ecodesign regulation.

It has to be underlined that **even if those types of LED sources fall short of efficacy requirements, they still perform far more efficiently than any alternative light source of any other technology and are the only realistic way to substitute a discharge source in professional entertainment luminaires.**

For the time being, there are no replacements of these specific LED sources on the market.

An inconsistent article in the ecodesign regulation also bears risks at the legal level as it would lead to **heterogenous implementation** of the text in the Member States. This would be highly problematic for the live performance and film sector, notably in the context of touring, when companies rely on luminaires of a host organisation when bringing their performance abroad.

We would like to draw the attention to the fact that the overall use of professional entertainment lighting in the context of a performance or a film is extremely limited. For example, stage lighting only counts for 5% of the overall energy consumption of a theatre. **The adjustments to be made in Annex III.3 to ensure consistency of point (w) will therefore not lead to repercussions on the overall energy savings related to the reviewed EU ecodesign regulation.**

Please find a **specific technical rationale** included in the proposal for amendment.

Thank you for considering our concerns.

We remain at your disposal for any further questions.

* The **European Entertainment Ecodesign Coalition** is a European-wide group of associations working in the entertainment, lighting design, live performance and film/TV sectors:

Pearle* – Live Performance Europe www.pearle.eu

IALD – International Association of Lighting Designers www.iald.org

PLASA – The Professional Lighting and Sound Association www.plasa.org

VPLT – The German Entertainment Technology Association www.vplt.org

ALD – The Association of Lighting Designers www.ald.org.uk

DTHG – German Theatre Technical Society www.dthg.de

OETHG – The Austrian Theatre Technology Association www.oethg.at

SLF – The Association of Swedish Lighting Designers www.svenska-ljus.se/english/

STEPP – The professional association of producers, designers and technicians of the arts and event sector in Belgium www.stepp.be

Proposal for amendment – preferential option 1

Annex III Exemptions

3. Any light source or separate control gear within the scope of this Regulation shall be exempt from the requirements of this Regulation, with the exception of the information requirements set out in point 3(e) of Annex II, if they are specifically designed and marketed for their intended use in at least one of the following applications:

<p>Commission regulation, voted on 17 December 2018, published on 7 February 2019</p> <p>(w) white light sources which</p> <p>(1) are designed and marketed specifically for scene-lighting use in film-studios, TV-studios and locations, and photographic-studios and locations, or for stage-lighting use in theatres, during concerts or other entertainment events;</p> <p>and which:</p> <p>(2) provide two or more of the following specifications:</p> <p>(a) LED with high CRI > 90;</p> <p>(b) GES/E40, K39d socket with changeable Colour Temperature down to 1800 K (undimmed), used with low voltage power supply;</p> <p>(c) LED rated at 180W and greater and arranged to direct output to an area smaller than the light emitting surface;</p> <p>(d) DWE lamp type which is a tungsten lamp defined by its wattage (650 W) voltage (120 V) and terminal type (pressure screw terminal);</p> <p>(e) white bi-colour LED sources;</p> <p>(f) fluorescent tubes: Min BI Pin T5 and Bi Pin T12 with CRI ≥ 85 and CCT 2 900, 3 000, 3 200, 5 600 or 6 500 K.</p>	<p>Proposal for amendment (according to the original proposal)</p> <p>(w) white light sources which</p> <p>(1) are designed and marketed specifically for scene-lighting use in film-studios, TV-studios and locations, and photographic-studios and locations, or for stage-lighting use in theatres, during concerts or other entertainment events;</p> <p>and which:</p> <p>(2) provide two one or more of the following specifications:</p> <p>(a) LED with high CRI > 90;</p> <p>(b) GES/E40, K39d socket with changeable Colour Temperature down to 1800 K (undimmed), used with low voltage power supply;</p> <p>(c) LED rated at 180W and greater and arranged to direct output to an area smaller than the light emitting surface;</p> <p>(d) DWE lamp type which is a tungsten lamp defined by its wattage (650 W) voltage (120 V) and terminal type (pressure screw terminal);</p> <p>(e) white bi-colour LED sources;</p> <p>(f) fluorescent tubes: Min BI Pin T5 and Bi Pin T12 with CRI ≥ 85 and CCT 2 900, 3 000, 3 200, 5 600 or 6 500 K.</p>
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Proposal for amendment – alternative option 2:

Annex III Exemptions

3. Any light source or separate control gear within the scope of this Regulation shall be exempt from the requirements of this Regulation, with the exception of the information requirements set out in point 3(e) of Annex II, if they are specifically designed and marketed for their intended use in at least one of the following applications:

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<p>(w) white light sources which</p> <p>(1) are designed and marketed specifically for scene-lighting use in film-studios, TV-studios and locations, and photographic-studios and locations, or for stage-lighting use in theatres, during concerts or other entertainment events;</p> <p>and which:</p> <p>(2) provide two or more of the following specifications:</p> <p>(a) LED with high CRI > 90;</p> <p>(b) GES/E40, K39d socket with changeable Colour Temperature down to 1800 K (undimmed), used with low voltage power supply;</p> <p>(c) LED rated at 180W and greater and arranged to direct output to an area smaller than the light emitting surface;</p> <p>(d) DWE lamp type which is a tungsten lamp defined by its wattage (650 W) voltage (120 V) and terminal type (pressure screw terminal);</p> <p>(e) white bi-colour LED sources;</p> <p>(f) fluorescent tubes: Min BI Pin T5 and Bi Pin T12 with CRI ≥ 85 and CCT 2 900, 3 000, 3 200, 5 600 or 6 500 K.</p>	<p>(w) white light sources which</p> <p>(1) are designed and marketed specifically for scene-lighting use in film-studios, TV-studios and locations, and photographic-studios and locations, or for stage-lighting use in theatres, during concerts or other entertainment events;</p> <p>and which:</p> <p>(2) provide two or more of the following specifications:</p> <p>(a new) LED based;</p> <p>(b) GES/E40, K39d socket with changeable Colour Temperature down to 1800 K (undimmed), used with low voltage power supply;</p> <p>(a b) LED Light sources with high CRI > 90;</p> <p>(c) LED Light sources rated at 180W and greater and arranged to direct output to an area smaller than the light emitting surface;</p> <p>(d) DWE lamp type which is a tungsten lamp defined by its wattage (650 W) voltage (120 V) and terminal type (pressure screw terminal);</p> <p>(e d) white bi-colour LED sources;</p> <p>(f) fluorescent tubes: Min BI Pin T5 and Bi Pin T12 with CRI ≥ 85 and CCT 2 900, 3 000, 3 200, 5 600 or 6 500 K.</p>

Rationale for the modifications requested:

Preferential option 1:

Annex 3 point (w), parts 1 and 2: This clause is logically inconsistent. It requires meeting two or more of the listed criteria but, with two exceptions, the criteria do not make such combinations and there are no combinations of more than two criteria. We therefore advocate the original wording of our amendment: "... (2) provide **one** or more of the following specifications".

Alternative option 2:

- (2) We note that point 1 already limits the scope of the exemption to specific purposes, nevertheless, we retain the value 'two' so as to ensure no unintended loopholes are created with more general scope.
- (2) (a new) The essential purpose of this exemption is to protect very high output LED sources that while efficient are unable for technical reasons to comply with the efficacy requirements, see below.
- (2) (b) LED sources used for the stated purposes with CRI of 90 and higher are intrinsically less efficient than LEDs with lower CRI due to increased yellow and red wavelength content that is not at the peak of the photopic response curve of the human eye, and therefore appear less luminous.

The efficacy calculation provides an allowance for high CRI by means of the 'R' value, however at very high powers this is largely insufficient. Small LED sources with high CRI may quite easily reach the efficacy requirements but the larger and more powerful the source becomes the more difficult it is. This comes about due to two physical effects that are thoroughly documented by the manufacturers of LED chips: The Auger effect and the Thermal Droop effect.

The Auger effect is a reduction of efficacy due to current density inside the LED die and is a chemistry phenomenon which at the current state of art is believed to be intrinsic to the design of LED chips. The second effect: Thermal Droop, is also fully documented and applies in varying amount to LED chips depending on the colour they emit.

The Auger effect reduces efficacy to a value in the range 75-85% at the highest rated die current compared to the die reference current. Thermal droop similarly reduces efficacy to around 80-90% of the rated efficacy at room temperature. The combination of these two effects can reduce efficacy by as much as 40% for chips operated at the highest rated current and the highest rated temperature.
- (2) (c) In focusable spotlights it is necessary to condense the light beam to the smallest possible area to match the internal aperture on the focus plane, known as the gate area. LEDs do not generate sufficient surface brightness (radiance) and so many must be employed in a large array. The array is typically several times the size of the gate. When LEDs are used for this purpose they require concentrating optics and often this is designed into a single light source component which is sealed. The component

contains a circuit board, LEDs and a number of refractive components. As many as four lenses may be present, i.e. 8 refractive surfaces. Each refractive surface attenuates the light by between 2% and 4% approximately. Typically, these light sources range in power from 180W to 1000W with higher powers anticipated. These powers are entirely inappropriate for any general-purpose applications for commercial or residential lighting and are only used in highly specialised products, in most cases these are entertainment spotlights or video projectors (we note that video projectors are excluded from the scope of the regulation). Because these devices are sealed and not intended to be opened, they would require testing as if a sole light source. The attenuation due to in-built optics, in the case of 4 lenses, is in the range 14%-25%. These devices also suffer the output reduction mentioned above due to their extremely high power and high temperature operation. The combined effects of integrated optics which cannot be excluded, operation at the highest permitted currents and temperature cause these light sources to fall far short of the efficacy requirements. Nevertheless, these types of LED sources still perform far more efficiently than any alternative light source of any other technology and are the only realistic way to substitute a discharge source in professional spotlight luminaires.

- (2) (d) This point is intended to cover light sources possessing multiple colours but not all the colours described in the CTLS exemption. Typically, these are used in film and television and comprise one or more broadband white sources optionally with blue and red sources to adjust the apparent colour temperature and green sources to adjust the desired Δuv .

Note on the removal of DWE lamp and fluorescent tubes:

For the sake of consistency, **all non-LED light sources (currently part of the article) are abolished in the suggested amendment.**

It has to be underlined that even if the listed types of LED sources fall short of efficacy requirements, they still perform far more efficiently than any alternative light source of any other technology and are for the time being the only realistic way to substitute a discharge source in professional entertainment luminaires.
