

# The Proposed 2020 EU Lighting Regulations – A Primer

ALD#



The European Union (EU) is proposing a new set of regulations governing lighting which, if passed as they currently stand, would dramatically affect all of the equipment used for entertainment lighting (including tungsten, arc and LED fixtures). These new regulations are intended to start from 1 September 2020.

If implemented as written, the new rules would heavily impact all areas of entertainment lighting and all who work in this field – lighting creators, lighting users and lighting manufacturers.

This document is intended as an introduction to these new regulations, how

they differ from the old regulations, how and why they will affect entertainment lighting so strongly, collecting as much information as possible together in one place.

Note that the guide has been informed and written by members of the Association of Lighting Designers (ALD) and others working in entertainment lighting, not specialists in the field of EU law. You are strongly advised to read the new regulations yourself. If you believe you will be directly impacted by them (particularly if you are a manufacturer), you are strongly advised to seek appropriate professional advice.

## **Background**

The Association of Lighting Designers was first alerted to these proposed changes by architectural lighting designer Kevan Shaw, who attends the relevant EU committee meetings on behalf of the International Association of Lighting Designers and its membership, which is largely those working in the field of architectural lighting design. Initially believing that the main effect of the proposals would be outlawing tungsten light sources, lighting designer Michael Hulls revived his Save Tungsten

campaign from 2013/2014. Based mainly on this premise, but also realising that the rules would affect some LED fixtures, the ALD very rapidly created and submitted a robust response just before the end of the EU's consultation period, 25 January 2018 (<https://bit.ly/2GVW79B>) accompanied by very strong reactions from across the ALD membership (<https://bit.ly/2HysMDm>).

The ABTT and PLASA also submitted responses. The ALD then set about alerting the theatrical community across Europe to the problem. In a number of cases local lighting practitioners were already aware of the problem and also working to find ways to address it.

## **Much more than just tungsten**

With time subsequently available for closer study of the new regulations, it has become clear that the new regulations will have an effect **dramatically wider than just banning tungsten: they will affect just about every lighting fixture used for entertainment lighting, tungsten, arc and LED.**

The ALD's campaign seeking revisions to these regulations is therefore now called **Save Stage Lighting.**

### *The current rules*

The first thing to note is that none of this is entirely new. For some years now, the EU has been working to introduce “Ecodesign” regulations aimed at forcing manufacturers to reduce the power consumed by their products, ideally by making them more energy efficient (i.e. achieving the same end result while using less power). Alongside the Ecodesign regulations are the Energy Labeling regulations – providing information in a standard format so that end users can compare the efficiency of related products from different manufacturers; these are the A++ – E tags you see on most electronic appliances.

There isn’t one set of “Ecodesign” rules; rather there is an overall objective to increase efficiency/reduce power consumption, then lots of individual sets of regulations covering different categories of products (one such set being why, for example, you can no longer buy high-powered vacuum cleaners for domestic use in the EU).

For lighting, the regulation currently in force is called EU1194/2012 “Implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment” (<https://bit.ly/1cZR2HZ>) with a very brief summary at <https://bit.ly/2HkmMAA>) and some useful guidance notes prepared by LightingEurope at <https://bit.ly/2IN0rsd>.

There’s also some background reading to similar changes being made around the world at <https://bit.ly/1qopl7J>.

The goal of the regulation – reduced power consumption – is, of course, laudable, and the regulation talks of the potential for the changes it enacted to make a combined annual saving of 25 TWh (Tera-Watt hours) by 2020 compared to taking no action.

The current regulation enforces particular energy efficiency standards on a whole range of lighting products outputting light in a defined colour range – broadly, cool-to-warm “white” light. The measurement is called the Energy Efficiency Index (EEI). The allowable value has been tightened in three stages: at the regulation’s introduction in September 2013, then again in September 2014, then again in September 2016. The result of these regulations was at first the move from tungsten to tungsten halogen for many lamp types (for example, the “eco” versions of R80 and similar reflector lamps), and more recently the increasing difficulty of obtaining many lamp types, including R-lamps and MR16 lamps, in any tungsten or halogen form at all, with only LED alternatives meeting the standards.

That this regulation has not really affected entertainment lighting is because it includes a specific exemption: article 2 section 4(b) ii, “lighting applications where the spectral distribution of the light is adjusted to the specific needs of particular technical equipment in addition to making the scene or object visible for humans (such as

studio lighting, show effect lighting, theatre lighting)”. (The same section includes an exemption for lighting products which have to “withstand extreme physical conditions” – the launching point for the “rough service” tungsten lamps you do still see available in the EU).

Exempt products do not have to meet the requirements of the current regulation, but are required to show performance information and indicate that they are not for domestic use.

The same “studio lighting, show effect lighting, theatre lighting” exemption was also included in a later regulation, 2015/1428, which amended two earlier regulations (224/2009 non-directional household lamps, 245/2009 products normally used as street lighting and office lighting): <https://bit.ly/2Hx58XP> and <https://bit.ly/2Hwp5Oj>.

The 2015 regulation seems to be an admission that progress in lamp technology had not been as fast as the EU had hoped, noting that “it does not appear to be economically feasible for manufacturers to develop and place on the market from 1 September 2016 onwards” lamps meeting the demands of the regulations that would be in place at that time. It therefore refined those demands but, crucially, kept the “studio lighting, show effect lighting, theatre lighting” exemption. It did, however, work harder to define “rough service” lamps, but continued to exempt lamps used for “signaling (such as traffic control or airfield lamps)”.

The date for the full implementation of regulation 244/2009 was subsequently (by a vote on 17 April 2015) revised again, to September 2018, the first time the EU rolled back an agreed product efficiency measure.

### *The cat and mouse game*

As required by its regulations, the EU continues to review those regulations, “to reflect technological progress”. The current review is called the “Ecodesign Working Plan 2016–2019”, which has “identified lighting products as one of the major savings opportunities”. Already in place is the new Energy Labeling Framework Regulation EU2017/1369; this regulation is why from 2 November 2018 you will see the EU energy labels run from A to G rather than A++ to E.

It’s also clear that part of this process involves identifying the loopholes that manufacturers or suppliers have exploited to continue selling their products in the EU, and closing them down. For example, many white LED light sources position themselves right on the edge of the EU’s definition of “white light” and so exempt themselves from the regulations, as do a number of “colour tuneable” domestic LED products. And of course there are all those lingering rough-service tungsten bulbs and the new wave of very domestic-looking “traffic light” lamps still available for sale.

### *The proposed new rules*

Which brings us to the proposed new Ecodesign and Energy Labelling regulations,

which don’t yet have numbers, but drafts of which together with an explanatory memorandum are available on the ALD website: <https://bit.ly/2GR9Bax>.

As before, many of the aims of the regulations are laudable. Those cited by the EU include continued reductions in power consumption (a reduction of 40–60TWh/annum by 2030 compared to making no changes), reduced mercury content/emission, and improvements in the quality of LED light (particularly with regard to the flicker and poor colour rendering of low-quality LED sources). It also includes what we might call the “Volkswagen” clause – that manufacturers shall not make products that change the way they operate under test conditions to circumvent the regulations; the same section also notes that “the power consumption of the product shall not increase after a software or firmware update... except with explicit consent of the end-user”.

Also introduced is a simplified way of identifying the efficiency of products, the current Energy Efficiency Index replaced with a simpler-to-calculate value: lumens per watt (lm/W), calculated by dividing the total light output in lumens by the power input at 230V in watts.

The energy efficiency of products is then categorised on the new A (210 lm/W)–G (85 lm/W) scale.

**To be clear: products that do not meet a standard of 85 lm/W (in addition to the other requirements, and unless specifically**

**exempted) will not be allowed to be supplied in the EU.**

As before, the aim is to drive improvements. The commission notes that as at the introduction of the new labeling regulations (October 2017) no commercially available light sources qualified for the new A and B categories – the best domestic LED sources would be class E, and the best available for professional use would be class D. They also expect class A to still be empty in 2020 – it is there so there’s “headroom” in the system as products get better.

The rules cover light sources (this being a lamp or a self-contained fixture capable of producing light) with a defined (and wider than previously) chromacity range, and a luminous flux between 60 and 8200 lumens. The lower limit is intended to exclude things like status display, pilot and decorative lamps. The EU notes in its Explanatory Memorandum that the upper limit is intended to exclude “very powerful lamps for e.g. sports lighting, theatre-, stage- and studio-lighting” (adding that “higher efficiency (LED) lamps are not (yet) readily available for these high power lamps, while users tend to be professionals that already pay attention to energy efficiency”.

Unfortunately, the range specified actually does include the vast majority of light sources in use in entertainment lighting today, up to and including about 800W HMI and 3kW tungsten, for example: <https://bit.ly/2GSxOh1> and <https://bit.ly/2GSs32G>.

To be clear: the EU is not proposing specifically to “ban” tungsten. It’s just that most tungsten sources used in entertainment lighting sit within this output range but do not meet the energy efficiency requirements (and deliberately so: in the Explanatory Memorandum, the EU notes that “the proposed Regulation... applies the same energy efficiency requirements to all these light sources, but only LED light sources can meet them. This implies e.g. that compact fluorescent lamps with integrated ballast (CFLi) and halogen lamps will no longer be able to enter the market from the application date of this Regulation onwards”).

As an example, a 230V 575W tungsten Source Four in open white outputs about 7489 lumens, so is 7489/575=13 lm/W. Even the HPL lamp itself outside the fixture outputs 11780 lumens at 575W, so is just 20 lm/W. The light source here is the lamp rather than the fixture, but if the lamps are no longer available the fixture becomes worthless.

But to make it clear that this is not just an issue with tungsten sources, take a much newer lightsource: the ETC Source Four LED Lustr2: with all emitters at full it is outputting 5882 lumens and drawing 160W. That’s 36.7 lm/W. Which still doesn’t meet the minimum requirement of 85 lm/W.

Moving lights? A Mac Viper Performance: 26000 lumens, 1000W, so 26 lm/W. The LED alternative? Encore Performance CLD (cool white), 11600 lumens from the fixture, 580W, so 20 lm/W (even using the figures of 39400 lumens/468W from the LED engine

in isolation still only gets to 84.2 lm/W) – all still short of the target. There is also a warm white version of the Encore (the WRM); for that the figures are 9200 lumens from the fixture (so 9200/580=15.8lm/W), 31500 lumens from the LED engine (31500/468=67 lm/W), an indication that warm white LEDs are currently less efficient than cool white.

Again, to be clear: the intention is not to single out ETC or Martin, but rather provide examples that are in widespread use and so familiar to many. Almost all of the fixtures and/or light bulbs used for entertainment lighting will fail to meet the regulations and so will no longer be permitted.

To compound the issue, the new regulations also impose a limit on “standby power” of just 0.5W when not emitting light. This is really intended for devices that can go into “deep sleep” where a few moments to respond to a turn-on command are not critical. Entertainment lighting fixtures are unlikely to be able to meet this standard, as they have to be active listening to show data (DMX or similar) and able to respond immediately; moving lights may also be active (moving to a new position) even if not actually lit.

But here’s the real reason this is all a problem: **completely absent from the proposed new regulations are all of the clauses exempting “studio lighting, show effect lighting, theatre lighting” that are found in the current regulations.**

For the first time, these rules would apply directly to the products we use every day.

### ***Placed on the market***

Slightly confusing the issue has been another key EU phrase, “placed on the market”. The new rules would only apply to products “placed on the market” after the regulations came into force.

The EU provides guidelines to the meaning of phrases it uses (<https://bit.ly/2cvKCH4>) but the explanation it contains is unclear, at first saying “a product is placed on the market when it is made available for the first time on the Union market” and that “products made available on the market must comply with the applicable Union harmonisation legislation at the moment of placing on the market”, which sounds like existing products could continue to be offered once the new rules came in.

Just a few paragraphs later, though, the document says, “the concept of placing on the market refers to each individual product, not to a type of product and whether it was manufactured as an individual unit or in series... individual units of the same model or type, which are placed on the market after the new requirements have become applicable, must comply with these requirements”.

To take the commonly used HPL lamp for the ETC Source Four fixture, this means that a new batch shipped from manufacturer to distributor would be regarded as being “placed on the market” for the first time. Since this and similar products would not meet the new regulations, they could no

longer be supplied to distributors after September 2020, and so would no longer be available to end-users once existing stocks held by distributors ran out.

The ALD's responses to the EU and the Save Stage Lighting campaign are all based on this understanding of the phrase "placed on the market". Note that, strictly, what's actually meant is that these products could no longer receive a CE mark and so would not be permitted to be sold in the EU. They could, of course, still be bought elsewhere in the world, though test cases in Germany have established that it is illegal to import non-CE marked lamps into the EU, and it is unclear what the response of an insurer would be if a mishap occurred while using a non-CE marked lamp.

One can hope that manufacturers will release massive batches of products to market on August 31st 2020 (so being "placed on the market" before the new rules came into effect), but even if they did, those would eventually run out. It's clear that in the domestic/office/industrial "general lighting" lighting market, which these regulations seem to be mainly aimed at, the EU expects that drop in replacements for existing light sources (i.e. LED equivalent bulbs) which do meet the regulations would be available. But this is not the case in our market, and as the ALD's response to the EU notes, the ramifications of this are massive, not just in terms of having to scrap long-serving fixtures, but also having to replace the control infrastructure (dimmers, control cabling) which supports them.

### ***Possible workarounds?***

There are a few lines in the new regulations which at first reading seem to provide a hope of possible workarounds.

First, there is an exemption for "light sources with special technical features for use in specific applications, including those related to health and safety, and for which higher energy efficiency alternatives are not available or not cost-effective". This would seem to suggest an allowance for (for example) a Source Four's lamps given their relatively low cost compared to a Source Four Lustr (plus their compatibility with existing infrastructure). However, it could also be argued that higher energy efficiency, cost-effective alternatives ARE available; it may be that these alternatives do not offer the light quality or other properties (smooth fades, good colour rendering etc) that we want, but those requirements are not covered by this exemption, only energy efficiency and cost-effectiveness.

This exemption is followed by a statement that "light sources that are currently allowed on the market to replace less efficient products, should remain available on the market to allow manufacturers and importers to benefit from the payback period of their investment". This again sounds hopeful – i.e. a Lustr2 (for example) could continue to be sold because it is more efficient than a Source Four. However, the reason a Lustr2 can be sold at the moment is not because of this, but because of other rules and exemptions within the current

regulation, so arguably it could not continue to be allowed on the market for the reasons specified here.

Annex 1 of the regulations includes exemptions for "image capture and image projection (including, but not limited to, photocopiers and video projectors)". One could argue that we are projecting light onto a stage (or we could put a gobo in every profile and call that projection), but it is tenuous. Light sources "with a beam angle of less than 10°" are also exempt, but purchasing 5° fixtures and then just swapping the lenses seems wasteful...

Annex 6 – Benchmarks includes the comment that "features required in certain applications, e.g. a high colour rendering, might prevent products offering those features from achieving these benchmarks". This again sounds like the kind of issue that would affect entertainment lighting fixtures, but while the problem is recognised here nothing is then done to allow fixtures which fail in this way but are required for these specialist applications.

Finally, there is the comment in the Explanatory Memorandum document that the 82000 lumen upper limit for light sources covered by these regulations is to "exclude very powerful lamps, e.g. sports lighting, theatre-, stage- and studio-lighting". However as noted, that light output level is far above the majority of fixtures used for theatre lighting. And this is merely an explanation, rather than being an actual part of the new regulation.

It is worth noting that the Directive which enables all of these Eco regulations (2009/125) includes in its Article 15 that the implementing measures should cause “no significant negative impact on the functionality of the product, from the perspective of the user” and that “there shall be no significant negative impact on consumers in particular as regards the affordability and the life cycle cost of the product”. However, the ALD has not yet established whether these rules have since been updated or superseded: <https://bit.ly/1n5liol>.

More generally it is worth pointing out that, for example, the Ecodesign rules for vacuum cleaners were not applied to industrial cleaners used by professionals, whereas these lighting rules appear to be intended to be applied everywhere.

However, just to be absolutely clear, and given that much of the new regulations seems to be about tightening up loopholes, **the ALD's position is that a clearly worded, categorical exemption that recognises the specialist nature of the equipment itself and the way it is used in entertainment lighting applications is absolutely required.**

***But we're leaving the EU, so in the UK, who cares?***

We are. But the UK government's plan for dealing with the issue of EU law is the “Great Repeal Bill” which will convert all EU-derived law into domestic UK law at the time of exit, so that the UK can then decide what to keep

and what to change. The status of this new regulation is slightly unclear since the time of Brexit (March 29, 2019) is before the start date of these new regulations (September 1, 2020). However, reports from the EU suggest that the regulation is being fast-tracked with an aim of having it enacted in October 2018. This would mean that having it come into effect in Sept 2020 would be part of the EU law taken into UK law.

Even if that were not the case, the UK would likely have to follow EU standards and verification procedures after Brexit in order to enable a soft border agreement with Northern Ireland and at the channel ports.

On a practical level, the UK is relatively small market compared to the EU as a whole and it is unlikely manufacturers will want to make “special case” UK versions. Plus many lighting practitioners work across Europe, and so would still find themselves affected by these regulations. It will surely be easier to campaign to change these regulations now, while we're part of the EU and have a voice, than later, when we're not, and so don't.

#### ***Surely science will save us?***

The EU's argument is in many ways a “stick and carrot” one: without demanding that manufacturers make better products, manufacturers have no incentive to make better products.

Unfortunately, those entertainment lighting manufacturers who have responded are pointing out that for entertainment lighting products, particularly lensed,

focusable spotlights (e.g. profile spots) and, very particularly, those using additive colour mixing, there is no possibility of meeting the new requirements by 2020.

This is for a multitude of technical reasons. The optical design of spotlights relies on having a very small, ideally point, source around which to design reflectors, lenses and an optical path. High powered LEDs cannot be “clustered together” as tightly as, for example, a tungsten filament; instead the source has to be made bigger. The greater size (called “étendue”) leads to higher waste and so lower efficiency.

Trying to achieve this with multiple colours for a colour-mixing source is even harder, particularly because of the need to have extra light output at the extremes of the colour spectrum to compensate for the human eye's lower photopic sensitivity at extreme colours. The limitations here are the physiology of the eye and the laws of optics and, ultimately, physics, none of which can be changed by regulation.

A further complication here comes because the manufacturers of the base LED sources are currently devoting most of their resources to improving the efficiency of white light LED sources, which are therefore improving more rapidly than coloured LED sources. You may have noticed this as the rise in entertainment fixtures coupling white light LED sources with traditional mechanical dichroic colour mixing.

A curious anomaly of all this is that it will potentially be permissible to use a white LED

source that meets the rules then filter it to make colour on stage, but not permissible to use an additive colour mixing source – despite the fact that the additive source would be more efficient in this situation since you'd only be turning on the precise colours you needed to the level you needed them, rather than turning on a white light to a higher level then removing bits of its colour.

The white source is only more efficient than the additive source when that exact shade of white is what's required.

Manufacturers also suggest that getting the standby power down to 0.5W while being able to react to DMX or, if a moving light, move with the lamp off, will be very hard.

### ***So I can't use my existing lights after September 2020?***

Even if these rules are imposed as written and adopted in the UK, there's nothing in them to stop you using your existing fixtures for as long as you like, or for as long as you can. But once existing stocks run out, you won't be able to get new lamps for your existing fixtures. The EU seems to expect that drop-in LED replacements will be available for many lamps, but while this may be true in the domestic/general service lighting sectors it will probably not be the case for entertainment fixtures (ETC, for example, offer a drop-in LED source for Source Fours that can be controlled from standard dimmers in the US, but they've abandoned development of a 230V version for technical reasons).

Stockpiling lamps is an option, but not a long-term solution.

### ***Is theatre lighting the energy baddie?***

No. Studies at the Seattle Rep and for the Mayor of London showed that on average, performance lighting forms less than 5% of a theatre's total power consumption (note that the 6% figure in the Mayor of London report includes sound and automation alongside lighting): <https://bit.ly/2qtGnUI> and <https://bit.ly/2vbCOCL>.

This is because of the very particular way entertainment lighting fixtures are used: usually for just a few hours a day (during performance), never all the lights on at the same time, rarely at full power.

In the time since these reports, many theatres have worked to reduce power consumption wherever possible, notably by changing worklights and houselights to LED fittings. The adoption of, particularly, LED moving lights in place of always-on arc-source versions is giving dramatic power savings, as well as the bonus of reduced running costs.

Improvements in efficiency are always welcome, but money spent replacing perfectly good performance lighting fixtures (turning them into waste, since there will be no hand-down or second hand demand for them) with new fixtures that use only fractionally less power will be money not spent on improving the efficiency of other parts of theatrical organisations where much bigger savings could be made. And the relatively small power savings that could

be achieved will likely be far outweighed by the scrap created and the energy required to manufacture and distribute new fixtures.

### ***So what can we do?***

The ALD's objective is to have the EU recognise the "special case" for entertainment lighting with an exemption from the regulations for the equipment we use, because of the special demands we place on it and the very particular way in which we use it. It feels like the EU does recognise this with their explanation of the upper lumen output chosen, but has not correctly understood the type of equipment we use. Helpfully, the EU already has a definition of this type of equipment (EN60598-2-17 Stage and Studio Luminaires); this definition has already been used in a relaxation of another area of EU regulation (electromagnetic compatibility – EMC – requirements) that has allowed us to continue to use the industry-standard thyristor dimmers.

PLASA is trying to rouse its manufacturer members to support an exemption on these grounds and the grounds that the engineering challenges posed by the kind of fixtures we use will not be solvable by September 2020. The ALD is working on a follow-up response to the EU to cover the new issues it has identified since submitting its initial response, to be submitted before 7 May 2018.

## In conclusion

Don't ignore this threat – it is real, and it is serious.

If you are reading this before 7 May 2018, there is still an EU public consultation running, and you should respond to it: <https://bit.ly/2oQ1IXc>. The ALD is running a petition calling for the EU to include an exemption for stage lighting, which you can find and sign here: <https://bit.ly/2qqcaWP>. Before or after that date, anything you can do to ensure your MP and MEP are aware of the problem and ideally campaigning for an exemption, would be invaluable. The ALD has available a template document containing some key facts. Don't submit this as is since it may be disregarded as a duplicate, but it provides a useful starting point. You can find your MEP here: <https://bit.ly/1aW4aBP>

## Ten-point summary if you read nothing else!

1. New regulations proposed for September 2020 will impose a minimum efficiency of 85 lumens per watt and a maximum standby power of 0.5W on all light sources (lamps or self-contained fixtures) to be sold in the EU.

2. The existing version of these regulations includes an exemption for stage lighting. The new regulations do not (though they do include exemptions for video projection, and suggest an exemption for stage lighting that appears to have mis-understood the light levels/power requirements of most theatrical lighting fixtures).

3. No tungsten fixtures meet this requirement. Many LED-based entertainment fixtures do not meet those requirements. After September 2020 no new stocks of such equipment can be supplied to the market in the EU.

4. Manufacturers suggest that the limits of optical design and LED efficiency mean that they will not be able to create certain types of fixtures that do meet the requirements by September 2020.

5. Nothing in the rules stops you from using existing fixtures. But bulbs can't be supplied to market and once you can't get new bulbs, existing fixtures become worthless – effectively scrap. It is unknown how long existing stocks of bulbs will remain available.

6. Replacing your existing fixtures might well mean replacing your entire dimming and control infrastructure.

7. All this for power savings that might be relatively small, given the way entertainment lighting is typically used, and will likely be far outweighed by the scrap created and the energy required to manufacture and distribute new fixtures.

8. Important tools from a lighting designer's toolkit will be lost within the EU, some forever.

9. This will dramatically affect performance venues and productions of all types and scales, including new and existing (long-running, long-standing rep) productions.

10. There are very few precedents for technologies to be banned if they are not unsafe to use. #

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## Notes and credits

Compiled and written for the Association of Lighting Designers ([www.ald.org.uk](http://www.ald.org.uk)) by Rob Halliday.

Proofreading and fact checking by the Save Stage Lighting team and other members of the entertainment lighting community.

This version: 14 April 2018.

This document will be updated periodically. The latest version can always be found at [www.ald.org.uk/resources/the-proposed-2020-eu-lighting-regulations-a-primer](http://www.ald.org.uk/resources/the-proposed-2020-eu-lighting-regulations-a-primer).

Note: The descriptions in this document are based on the ALD's interpretation and understanding of the proposed and existing EU laws covering lighting. They are offered in good faith for information, but neither the ALD or the author will be held liable for errors or inaccuracies. While the regulations are reasonably clearly written, there are sections that are open to quite widely different interpretations. You should take the time to read the regulations yourself. If you are making critical decisions that could be affected by these regulations, you should seek professional advice.

This document is intended to inform as many people as possible about these proposed regulations and their potential consequences for entertainment lighting. You may therefore distribute this document to anyone who it may be useful to. However, please only distribute this document in its entirety, and be sure to credit the ALD and provide the link to the current version.

The logo for the Association of Lighting Designers (ALD) is written in a bold, red, hand-drawn style. The letters 'A', 'L', and 'D' are connected, and a red hashtag symbol (#) is positioned to the upper right of the 'D'.