Texte zu den geplanten neuen EU-Regelungen zur umweltgerechten Produktgestaltung und zur Energieverbrauchskennzeichnung in der Beleuchtung – Zusammenstellung * des Umweltbundesamtes (UBA), Deutschland

Entwürfe der EU-Kommission vom 13. November 2017

Stellungnahme des Herstellerverbandes LE ** vom 24. Januar 2018

– Produktgestaltung –

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 * of the Federal Environment Agency (UBA), Germany

The EU Commission's drafts of 13 November 2017

Comments by the Industry Association LE ** as of 24 January 2018

– Product design –

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

Les projets de la Commission Européenne du 13 novembre 2017

Commentaires de l'association de producteurs LE ** du 24 janvier 2018

– Conception des produits –

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

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* http://www.eup-network.de/de/eup-netzwerk-deutschland/offenes-forum-eu-regelungen-beleuchtung/dokumente/texte/

** LE = Lighting Europe; http://www.lightingeurope.org/

Liste der von Lighting Europe (LE) am 24. Januar 2018 versandten Dokumente und Kennzeichnung des vorliegenden Textes

- Hauptanliegen
- Produktgestaltung
- Produktinformation

EN: List of the documents, sent out by Lighting Europe (LE) on 24 January 2018 and identification of the text at hand

- Main concerns
- Product design
- Product information

FR: Liste des documents qui Lighting Europe (LE) a envoyé le 24 janvier 2018 et marquage de le présent document

- Préoccupations principales
- Conception des produits
- Informations relatives au produit

Es folgt ein unveränderter Originaltext.

EN: The following is an unmodified original text.

FR: Ce qui suit est un texte original.

LightingEurope – List of comments to European Commission's proposal on a Single Lighting Regulation
Date: 24 January 2018

European Commission proposal	LightingEurope proposal	LightingEurope comments and questions
Preamble THE EUROPEAN COMMISSION, Having regard to the Treaty on the Functioning of the European Union, Having regard to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products ([1]), and in particular Article 15(1) thereof, After consulting the Ecodesign Consultation Forum, Whereas: (1) Directive 2009/125/EC requires the Commission to set ecodesign requirements for energy-related products representing significant volumes of sales and trade, having a significant environmental impact and presenting significant potential for improvement through design in terms of their environmental impact, without entailing excessive costs. (2) Article 16(2)(a) of Directive 2009/125/EC provides that in accordance with the procedure referred to in Article 19(3) and the criteria set out in Article 15(2), and after consulting the Ecodesign Consultation Forum, the Commission shall, as appropriate, introduce implementing measures starting with those products that offer a high potential for cost-effective		

[1] OJ L 285, 31.10.2009, p. 10.

reduction of greenhouse gas emissions, such as lighting. (3) The European Commission set ecodesign requirements for lighting products through three implementing measures: Commission Regulation (EC) No 244/2009 ([2]) and its successive amendments ([3]), Commission Regulation (EC) No 245/2009 ([4]) and its successive amendments ([5]) and Commission Regulation (EU) No 1194/2012 ([6]) and its successive amendment ([7]). The three regulations require that the European Commission shall review them in light of technological progress. (4) The Commission carried out a review study to analyse the technical, environmental and economic aspects of lighting products. The study was developed together with stakeholders and interested parties from the Union and third countries and the results have been made publicly available. (5) The results of this study show the benefit of updating the requirements for lighting products. The review also shows the benefit of simplifying the requirements to be applied to lighting products, in particular by having one single regulation for this product group. (6) The unification of the three existing regulations is in line with the Commission's 'Better Regulation' policy with the main aim to decrease administrative burden for manufacturers and importers, and to facilitate verification by market surveillance		

[2] OJ L 76, 24.3.2009, p. 3.
[3] OJ L 247, 19.9.2009, p.3 and OJ L 244, 27.8.2015, p.1
[4] OJ L 76, 24.3.2009, p. 17.
[5] OJ L 104, 24.4.2010, p.20 and OJ L 244, 27.8.2015, p.1
[6] OJ L 342, 14.12.2012, p. 1.
[7] OJ L 244, 27.8.2015, p.1

authorities, inter alia by better defining the scope and exemptions, reducing the number of parameters for compliance testing and decreasing the time of some test procedures. Following the review, a uniform formula is set to calculate the energy efficiency for all the lighting products that are in the scope of the three existing regulations, including incandescent, halogen, fluorescent, high-intensity discharge and light-emitting diodes (both inorganic – LED – and organic – OLED). Light sources and their control gears as defined in Article 2 come within the subject of this Regulation resulting from the combination of the products in scope of the three existing regulations. (7) The environmental aspects that have been identified as significant for the purposes of this Regulation are energy consumption in the use phase along with mercury content and mercury emissions.		
(8) Ecodesign requirements for products subject to this Regulation should be set with a view to improving the environmental performance of the products concerned, contributing to the functioning of the internal market and to the Union objective of reducing energy consumption and promoting a circular economy.		
(9) In 2015, the EU-28 electricity consumption for lighting was 335 TWh/y, covering 12.4% of the overall EU-28 electricity use. This corresponds to greenhouse gas (GHG) emissions of 132 megatons of CO_2 equivalent per year ($MtCO_2eq/y$) to 2.8% of the overall EU-28 GHG-emission.	(9) In 2015, the EU-28 electricity consumption for lighting was 335 TWh/y, covering 12.4% of the overall EU-28 electricity use. This corresponds to greenhouse gas (GHG) emissions of 132 megatons of CO_2 equivalent per year ($MtCO_2eq/y$) to 2.8% of the overall EU-28 GHG-emission. *** reference report …**	Where is the information coming from?

(10) It is estimated that this Regulation will reduce the energy consumption for lighting by 40-60TWh/a in 2030 with respect to a Business-as-Usual scenario. This translates into around 20 $MtCO_2eq/a$ savings of GHG emissions in 2030. It is estimated that this Regulation will reduce the total user expense for lighting by 11-15 billion euros per year in 2030 with respect to a BAU-scenario.	(10) It is estimated that this Regulation will reduce the energy consumption for lighting by 40-60TWh/a in 2030 with respect to a Business-as-Usual scenario. This translates into around 20 MtCO2eq/a savings of GHG emissions in 2030. It is estimated that this Regulation will reduce the total user expense for lighting **energy consumption** by 11-15 billion euros per year in 2030 with respect to a BAU-scenario.	To our knowledge the prices of new luminaires and their replacement costs are not accounted for in Melissa
(11) Setting additional energy efficiency requirements for light sources should lead to a decrease in the overall mercury emissions. In addition, the mercury content of light sources is restricted by Directive 2011/65/EU of the European Parliament and of the Council (RoHS)[8]. Hence, no specific ecodesign requirements on mercury content should be set in this Regulation. (12) The electricity consumption of products subject to this Regulation could be lowered by applying existing non-proprietary cost-effective technologies, which lead to a reduction of the combined expenses for purchasing and operating the equipment.		
(13) The ecodesign requirements should not affect functionality from the user's perspective and should not negatively affect health, safety or the environment. In particular, the benefits of reducing the electricity consumption during the use phase should outweigh any potential additional environmental impact during the production phase of products subject to ecodesign requirements. In order to ensure consumer satisfaction with more energy efficient	(13) The ecodesign requirements should not affect functionality from the user's perspective and should not negatively affect health, safety or the environment~~. In particular, t.~~The benefits of reducing the electricity consumption during the use phase should outweigh any potential additional environmental impact during the production phase of products subject to ecodesign requirements. ~~In order t~~To ensure consumer satisfaction with more energy efficient	This section indicates that eco requirements are used so that if no adequate replacement is available the total environmental effect should be judged. For lamps in a containing product a reasonable time should be given with respect to the lifetime of the containing product. Example: conventional lamps in a cooker-hood are a replacement product that should be available for the lifetime of the cooker hood.

[8] OJ L 174, 1.7.2011, p. 88, and amendments.

products, functional requirements should be set. Product information requirements should allow consumers to make informed choices.	products, functional requirements should be set. **Such functional requirements will also allow market surveillance authorities in their verification duties to ensure a level playing field among the manufacturers and importers of lighting products.** Product information requirements should allow consumers to make informed choices.	
(14) Mandatory ecodesign requirements apply to products placed on the Union market wherever they are installed or used and should therefore not be made dependent on the application in which the product is used. (15) Exemptions from the requirements set out in this Regulation should be made 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. 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. (16) Low-quality LED light sources on the market have potential flicker problems which can cause health issues. As LED light sources are among the high-efficiency lighting technologies emerging on the market, it is appropriate to set a functional requirement on flicker for LED and OLED light sources that can be operated directly on the mains electricity supply.		
(17) Measurements of the relevant product parameters should be performed through reliable, accurate and reproducible measurement methods, which take into		

account the recognised state-of-the-art measurement methods including, where available, harmonised standards adopted by the European standardisation bodies, as listed in Annex I to Directive 98/34/EC of the European Parliament and of the Council ([9]).		
(18) In accordance with Article 8 of Directive 2009/125/EC, this Regulation should specify the applicable conformity assessment procedures. (19) In order to facilitate compliance checks, manufacturers should provide information in the technical documentation referred to in Annexes V and VI to Directive 2009/125/EC in so far as that information relates to the requirements laid down in this Regulation.		
(20) Commission Regulation (EU) 2016/2282 ([10]) amends several ecodesign implementing measures with regard to the use of tolerances in verification procedures of the measured parameters by Member State authorities. However, it did not amend the three regulations on lighting products, but clarified that the intended use of tolerances for lighting products would be reassessed in conjunction with the review of the three regulations. Hence this Regulation specifies tolerance values for lighting parameters and adopts the approach of declared values as laid down in Commission Regulation (EU) 2016/2282. The mandatory information on verification testing, including the model of the product tested and the results of the procedure, will minimise unnecessary double testing while reducing the number of non-compliant models on the Union market.	(20) Commission Regulation (EU) 2016/2282 ([11]) amends several ecodesign implementing measures with regard to the use of tolerances in verification procedures of the measured parameters by Member State authorities. However, it did not amend the three regulations on lighting products, but clarified that the intended use of tolerances for lighting products would be reassessed in conjunction with the review of the three regulations. Hence this Regulation specifies tolerance values for lighting parameters and adopts the approach of declared values as laid down in Commission Regulation (EU) 2016/2282. The mandatory information on verification testing **provided by Member State authorities**, including the model of the product tested and the results of the procedure, will minimise unnecessary double testing while reducing the number of non-compliant models on the Union market.	- In reference to the last sentence: “The mandatory information”: It is not clear from whom the information is coming. “Member State authorities” should be included.

[9] OJ L 204, 21.7.1998, p. 37.
[10] OJ L 346, 20.12.2016, p. 51.
[11] OJ L 346, 20.12.2016, p. 51.

(21) In addition to the legally binding requirements laid down in this Regulation, indicative benchmarks for best available technologies should be identified. This will help to ensure the wide availability and easy accessibility of information on the life cycle environmental performance of products subject to this Regulation, in particular for small and medium-sized enterprises, which will further facilitate the integration of best design technologies and the development of more energy- and resource efficient products. (22) A further review of this Regulation should assess the appropriateness and effectiveness of its provisions in achieving its goals, and also address some topics that could not be considered in this Regulation because of a current lack of an agreed metric, measurement method or acceptability limits, such as flicker, colour rendering and light output. The timing of the review should be sufficient for all provisions to be implemented and show an effect on the market.		
(23) This Regulation should apply from 1 September 2020, while allowing existing requirements from the three regulations repealed through this act to stay in force until that date. The application of the ecodesign requirements should provide sufficient time to manufacturers to re-design products subject to this Regulation. The timing should be such that any negative impact on functionalities of products on the market is avoided and that the cost impact for end-users and manufacturers, in particular small and medium-sized enterprises, is taken into account, while ensuring timely achievement of the objectives of this Regulation.	(23) This Regulation should apply from 1 September 2020, while allowing existing requirements from the three regulations repealed through this act to stay in force until that date. The application of the ecodesign requirements should provide sufficient time to manufacturers to re-design products subject to this Regulation. The timing should be such that any negative impact on functionalities of products on the market is avoided and that the cost impact for end-users and manufacturers, in particular small and medium-sized enterprises, is taken into account, while ensuring timely achievement of the	This section indicates that eco requirements are used so that if no adequate replacement is available the total environmental effect should be judged. For lamps in a containing product a reasonable time should be given with respect to the lifetime of the containing product. Example: conventional lamps in a cooker-hood are a replacement product that should be available for the lifetime of the cooker hood.

	objectives of this Regulation. **Lighting products used as a replacement component in a containing product are allowed on the market during the average lifetime of the containing product (e.g. lamps as a replacement component in sewing machines, cooker-hoods, etc)**	
(24) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2009/125/EC, HAS ADOPTED THIS REGULATION:		
Article 1: Subject matter and scope 1. In accordance with Article 15 of Directive 2009/125/EC, this Regulation establishes ecodesign requirements for placing on the market of light sources and separate control gear for light sources. The requirements also apply to light sources and separate control gear placed on the market in a containing product.	1. In accordance with Article 15 of Directive 2009/125/EC, this Regulation establishes ecodesign requirements for placing on the market of light sources and separate control gear for light sources. **The requirements shall also apply for placing on the market light sources and separate control gears in a containing product.**	In both cases, whether in a containing product or not, the requirements shall apply only from the moment of placing on the market. The original text could be understood so that that products in containing product placed on the market before 1st Sep 2020 should meet the requirements.
2. This Regulation shall not apply to light sources and separate control gears specified in Annex I points 1 and 2. Light sources and separate control gears specified in Annex I point 3 shall comply only with the requirements of Annex III point 3.5.		
Article 2: Definition In addition to the definitions set out in Directive 2009/125/EC, the following definitions shall apply for the purposes of this Regulation: (1) *'light source'* means an electrically operated product intended to emit and/or be possibly tuned to emit light with all of the following optical characteristics:		
(a) chromaticity coordinates x and y in the range 0,270 < x < 0,530 and		

– 2,3172 x^2 + 2,3653 x – 0,2199 < y < – 2,3172 x^2 + 2,3653 x – 0,1595;		
(b) a luminous flux < 1000 *lm per mm²* of projected light-emitting surface area as defined in Annex II;	(b) a luminous flux < **264 *lm per mm²*** of projected light-emitting surface area as defined in Annex II;	See pt. (55) in Annex II and VHK value proposal The HID stage and studio lamps to be included in (a) and lowering the luminous flux < 1 000 lm per mm2 of projected light-emitting surface area in Article 2: Definitions (1) (b) to luminous flux < 264, the HID stage and studio lamps would be exempted by this parameter and would not need any other technical parameter that makes them special purpose. In the note is mentioned that the value of 1 000 is well above what LEDs can do (264 lm/mm2) and discussion point could be to reduce this value
(c) a luminous flux between 60 and 82 000 *lumen*;		
(d) a colour rendering index CRI > 0 *Ra*; using incandescence, fluorescence, high-intensity discharge, light emitting diodes or their combinations as lighting technology. High-pressure sodium light sources (HPS, as defined in Annex II) that do not fulfil condition (1)(a) are anyway considered light sources in the sense of this Regulation.	(d) **a colour rendering index (CRI) Ra > 0;** using incandescence, fluorescence, high-intensity discharge, light emitting diodes or their combinations as lighting technology. High-pressure sodium light sources (HPS, as defined in Annex II) that do not fulfil condition (1)(a) are anyway considered light sources in the sense of this Regulation.	
If a containing product is itself a light source, the light source to be considered for the purpose of this Regulation is the smallest physical unit that can be readily removed from the containing product without permanent mechanical damage and that meets the definition for light source.	**Light source to be considered for the purpose of this Regulation** is the smallest physical unit that can be readily removed from the containing product without permanent mechanical damage **of the light source** and that meets the definition for light source**. The light source to be considered for the purpose of this Regulation is the smallest physical unit, such as lamps, modules, or the part of the containing product as identified by the manufacturer partially**	- Individual LED components are not to be considered a light source. - The permanent mechanical damage is not related to the containing product. - The light source to be considered for the purpose of this Regulation is the smallest physical unit, such as lamps, modules, or partially disassembled containing product for the purpose of market surveillance. For explanation, see pt. (55) in Annex II and VHK study

	disassembled containing product for the purpose of market surveillance. If a containing product is itself a light source, the light source to be considered for the purpose of this Regulation is the smallest physical unit that can be readily removed from the containing product without permanent mechanical damage **of the light source** and that meets the definition for light source. **The light source to be considered for the purpose of this Regulation is the smallest physical unit, such as lamps, modules, or the part of the containing product as identified by the manufacturer partially disassembled containing product for the purpose of market surveillance**	
(2) *'control gear'* means one or more devices, possibly integrated in a light source, intended to prepare the mains electricity supply for the electric format required by one or more specific light sources within boundary conditions set by electric safety and electromagnetic compatibility. It may include transforming the supply and starting voltage, limiting operational and preheating current, preventing cold starting, correcting the power factor and/or reducing radio interference. The term does not include power supplies within the scope of Commission Regulation (EC) No 278/2009 ([12]). The term does also not include lighting control parts and non-lighting parts (as defined in Annex II), although such parts may be physically integrated with a control gear or marketed together as a single product.	(2) '*control gear'* means ~~one or more~~ a device~~s~~ **located between the electrical supply and one or more light sources, which provides a functionality related to the operation of the light sources(s), such as transforming the supply voltage, limiting the current of the lamp(s) to the required value, providing starting voltage and preheating current, preventing cold starting, correcting the power factor or reducing radio interference. The device may be designed to connect to other control gear to perform these functions. The device may be integrated in the light source. The term does not include:** **— control devices**	- This proposal is modified from regulation 1194/2012. The term "lamp" has been changed to "light sources". - To align with current practices, Ignitors, starter switches and separate compensation capacitors should not be included in the efficiency measurements. - These components are typically supplied from different vendors and affect minimally for the results so not to do the life of these component manufacturers too complicated, it sensible to continue the same practice as today. - Referring to VDE comment on displacement factor, I prefer the current term "power factor". It is not essential whether the term is not mentioned in the regulation, but the power factor contains both displacement factor and the harmonics, which both may be corrected by the control gear.

OJ L 346, 20.12.2016, p.

	A Power over Ethernet (PoE) switch is not a control gear in the sense of this Regulation.	**— separate ignitors, starter switches and compensation capacitors** **— power supplies within the scope of Commission Regulation (EC) No 278/2009 (11);**	
(3)	'*separate control gear*', means a control gear that is not physically integrated with a light source and is placed on the market as a separate product or as a part of a containing product.		
(4)	*'containing product'* means a product containing one or more light sources and/or separate control gears in scope of this Regulation. Manufacturers or importers of containing products shall enable verification by market surveillance authorities of compliance of light source(s) and/or control gear(s) as set out in Annex IV.		The definition of "Containing products" is not clear.
(5)	*'light'* means electromagnetic radiation with a wavelength between 380 *nm* and 780 *nm.*		
(6)	*'mains'* or *'mains voltage'* or *'mains electricity supply'* (MV) means the electricity supply of 230 (±10%) *Volt* of alternating current at 50 *Hz*.		
(7)	*'chromaticity'* means the property of a colour stimulus defined by its chromaticity coordinates (x and y).		
(8)	*'luminous flux'* or *'flux'* (Φ), expressed in lumen (*lm*), means the quantity derived from radiant flux (radiant power) by evaluating the electromagnetic radiation in accordance with the spectral sensitivity of the human eye. It refers to the total flux emitted by a light source in a solid angle of 4π *steradians* under conditions (e.g. current, voltage, temperature) specified in applicable standards. It refers to the initial flux for the undimmed light source after a short operating period, unless it is		

clearly specified that the flux in a dimmed condition or the flux after a given period of operation is intended. *'Luminous flux*' without further specification is the total luminous flux in a 360° sphere. For light sources that can be tuned to emit different light spectra and/or different maximum light intensities, it refers to the flux in the 'reference control settings' as defined in Annex II.		
(9) *'colour rendering index'* (CRI), expressed in *Ra*, means the effect of an illuminant on the colour appearance of objects by conscious or subconscious comparison with their colour appearance under the reference illuminant.	(9) *'colour rendering index'* (CRI), expressed in *Ra* **(with 8 test colours included)**, means the effect of an illuminant on the colour appearance of objects by conscious or subconscious comparison with their colour appearance under the reference illuminant.	LightingEurope position is that CRI is based on the 8 standard test colours.
(10) *'incandescence'* means a phenomenon where light is produced from heat, in light sources typically produced through a threadlike conductor ('filament') which is heated by the passage of an electric current.		
(11) *'halogen light source'* (HL) means an incandescent light source with a threadlike conductor made from tungsten surrounded by gas containing halogens or halogen compounds.		
(12) *'gas discharge'* means a phenomenon where light is produced, directly or indirectly, by an electric discharge through a gas, plasma, metal vapour or mixture of gases and vapours.		
(13) *'high intensity discharge'* (HID) means an electric gas discharge in which the light-producing arc is stabilised by wall temperature and the arc has a bulb wall loading in excess of 3 *Watts per square centimetre*. For the purpose of this Regulation, HID light sources are limited to metal halide, high-pressure sodium and mercury vapour types as defined in Annex II.	(13) *'high intensity discharge'* (HID) means an electric gas discharge in which the light-producing arc is stabilised by wall temperature and the arc **chamber** has a bulb wall loading in excess of 3 *Watts per square centimetre*. For the purpose of this Regulation, HID light sources are limited to metal halide, high-pressure sodium and	The bulb wall should refer to the bulb of the arc itself not to the area of the outer bulb.

	mercury vapour types as defined in Annex II.	
(14) *'fluorescence'* or *'fluorescent light source'* (FL) means the phenomenon or a light source using an electric gas discharge of the low-pressure mercury type in which most of the light is emitted by one or more layers of phosphors excited by the ultraviolet radiation from the discharge. Fluorescent light sources may have one ('single-capped') or two ('double-capped') connections ('caps') to their electricity supply. For the purposes of this Regulation, magnetic induction light sources are also considered as fluorescent light sources.		
(15) '*inorganic light emitting diode'* (LED) means a technology in which light is produced from a solid state device embodying a p-n junction of inorganic material. The junction emits optical radiation when excited by an electric current.		
(16) '*organic light emitting diode'* (OLED) means a technology in which light is produced from a solid state device embodying a p-n junction of organic material. The junction emits optical radiation when excited by an electric current.		
(17) '*Power-over-Ethernet switch*' or '*PoE switch*' means equipment for power-supply and data-handling that is installed between the mains and office equipment and/or light sources for the purpose of data transfer and power supply.		
(18) '*flicker*' means the perception of visual unsteadiness induced by a light stimulus the luminance or spectral distribution of which fluctuates with time, for a static observer in a static environment. The fluctuations can be periodic and non-periodic and may be induced by the light source itself, the power source or other influencing factors.		

(19) *New point*	***(19) 'declared value'* for a parameter means the value given by the manufacturer or importer in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC.**	- The definition of declared value is needed.
Other definitions are set out in Annex II.		
Article 3: Ecodesign requirements Any product in scope of this Regulation shall meet the ecodesign requirements specified in Annex III of this Regulation, except when exempt according to Annex I points 1 and 2. Products specified in Annex I point 3 shall comply only with the requirements set out in Annex III point 3.4. Ecodesign requirements shall apply from 1 September 2020.		
Article 4: Removal of light sources and separate control gears Manufacturers and importers shall ensure that light sources and separate control gears in scope of this Regulation can be readily removed without permanent mechanical damage by the end-user from any product containing them that is placed on the market. Where light sources and separate control gears in scope of this Regulation cannot be readily removed by the end-user, manufacturers and importers shall ensure that the containing product is designed in such a way that light sources and separate control gears in scope of this Regulation can be readily removed by qualified professionals. Containing products shall be accompanied by instructions on how light sources and separate control gears can be readily removed by either the end-user or by qualified professionals.	**Article 4: Removal of light sources and separate control gears** **4.1 Requirements on light sources and separate control gears related to verification for market surveillance purposes** Manufacturers and importers shall ensure that light sources and separate control gears in scope of this Regulation can be ~~readily~~ removed without ~~permanent mechanical damage~~ **being permanently damaged for verification purposes. For containing products, instructions should be available on request on how light sources and separate control gears can be removed for verification without these being permanently damaged.** **4.2 Requirements on light sources and separate control gears at end of life** Manufacturers and importers **of containing products** shall ensure that **light sources and**	Further steps of circular economy shall be subject to review of this Regulation and proper impact assessment after 2022 considering electrical safety. For instance, manufacturers and importers shall ensure that light sources and separate control gears in scope of this Regulation can be readily removed while maintaining electrical and photobiological safety, EM compatibility and RoHS compliance without permanent mechanical damage by end-users or qualified persons or manufacturers, from any disassembled product having less than IP 65* containing them that is placed on the market. Containing products shall be accompanied by instructions on how light sources and separate control gears can be removed by either the end-user or by qualified professionals.

	separate control gears in scope of this Regulation can be dismantled from containing products. Instructions shall be available on request. **4.3. Requirements on light sources and separate control gears for replaceability.** Manufacturers and importers of containing products shall **provide information about the replaceability or non-replaceability of light sources and control gears in scope of this Regulation by end-users or qualified persons without permanent damage to the containing product. Such information shall be available on free-access websites. For products sold directly to end-users, this information shall be on the packaging, at least in the form of a pictogram.** **Any further Circular Economy aspects shall be subject to review in 2022, after a thorough impact assessment, taking current legislation into account.** * Reference to standard EN 60598-1	
Article 5: Circumvention The manufacturer or importer shall not place on the market products that have been designed so that a model's performance is automatically altered in test conditions with the objective of		

reaching a more favourable level for any of the parameters declared by the manufacturer in the technical documentation or included in any of the documentation provided with the product.		
Where applicable, the power consumption of the product shall not increase after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user.		- What is the definition of "explicit consent"? - How is the product update addressed in case of future firmware updates especially in cases where the light source or control gear is included in systems designed by third parties? - The communication to the end user is difficult since it affects the serviceable luminaires proposition designed for circular economy. Does this allow upgrading of products with e.g. presence sensors?
Article 6: Conformity assessment 1. The conformity assessment procedure referred to in Article 8 of Directive 2009/125/EC shall be the internal design control set out in Annex IV to that Directive or the management system set out in Annex V to the same Directive.		
2. For the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC, the technical documentation file shall: (a) contain the product information specified in Annex III.3.4 of this Regulation; (b) provide any other information required by this Regulation to be present in the technical documentation file.	**Add Point (c)** **NEW (c) specify at least one realistic combination of product settings and conditions in which the product complies with this Regulation.**	LightingEurope suggests keeping the original sentence in 2012/ 1194: c) specify at least one realistic combination of product settings and conditions in which the product complies with this Regulation. Some products will have an existing EM or Ballast connected. For products, such as MR16 LED, TLED, the wattage is linked to the ballast type/model. Wattage shall be measured in specified combination.
Article 7: Verification procedure for market surveillance purposes Member States shall apply the verification procedure described in Annex IV to this Regulation when performing the market		

surveillance checks referred to in Article 3(2) of Directive 2009/125/EC.		
Article 8: Indicative benchmarks The indicative benchmarks for the best-performing products and technologies available on the market at the time of adoption of this Regulation are set out in Annex V.	**Article 8: Indicative benchmarks** The indicative benchmarks for the best-performing products and technologies available on the market at the time of adoption of this Regulation are set out in **Annex VI.**	
Article 9: Repeal Commission Regulation (EC) No 244/2009, Commission Regulation (EC) No 245/2009 and Commission Regulation (EU) No 1194/2012 shall be repealed from 1 September 2020.		
Article 10: Revision The Commission shall review this Regulation in the light of technological progress and shall present the results of that review to the Ecodesign Consultation Forum no later than 1 September 2022. This review shall inter alia consider: – setting more stringent energy efficiency requirements for all light source types, in particular for non-LED light source types, and for separate control gears; – setting requirements on lighting control parts; – exploring stroboscopic effects; – setting requirements on dimming, including the interaction with flicker; – substituting the CRI colour rendering metric by a more adequate metric; – adequacy of lumen as a stand-alone metric for the quantity of visible light; – setting additional resource efficiency requirements for products in accordance with the principles of the circular economy.		
Article 11: Entry-into-force		

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*. This Regulation shall be binding in its entirety and directly applicable in all Member States. Done at Brussels, *For the Commission* Jean-Claude JUNCKER *The President*		

ANNEX

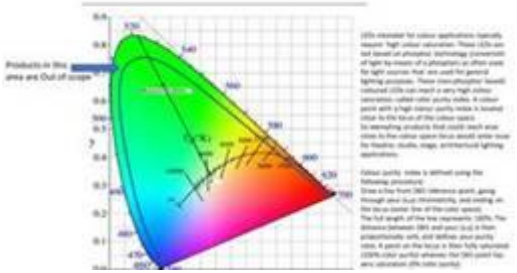
ANNEX I - EXEMPTIONS 1. This Regulation shall not apply to light sources and separate control gears specifically tested and approved to operate:		
(a) in potentially explosive atmospheres as defined in directive 2014/34/eu ([13]) of the european parliament and of the council;		Editorial mistake, there are 2 paras. (a)
(a) for emergency use as set out in Directive 2014/35/EU of the Council and the Parliament ([14]);		Editorial mistake, there are 2 paras. (a)
(b) in radiological and nuclear medicine installations, as defined in Article 3 of Directive 2009/71/EURATOM ([15]);		
(c) in or on military or civil defence establishments, equipment, ground vehicles, marine equipment or aircraft as set out in Member States' Regulations or in documents issued by the European Defence Agency;		
(d) in or on motor vehicles, their trailers and systems, components and separate technical units intended as set out in Regulation No 661/2009 ([16]), Regulation (EU) No 168/2013 ([17]) and their amendments;		

51.
L 96, 29.3.2014, p. 309-356 (the 'ATEX Directive')
[14] OJ L 96, 29..3.2014, p. 357-. (the 'Low Voltage Directive')
[15] OJ L 172, 2.7.2009, p. 18-.
[16] OJ L 200, 31.7.2009, p.1-24
[17] OJ L60, 2.3.2013, p. 52

(e) in or on civil aviation aircrafts as set out in Commission Regulation 748/2012 ([18]);		
(f) in railway vehicle lighting as set out in Directive 2008/57/EC ([19]) and its amendments, as well as relevant Member State legislation;		
(g) in marine equipment as set out in Council Directive 2014/90/EU ([20]) and its amendments or recasts;		
(h) in medical devices as set out in Council Directive 93/42/EEC ([21]) and in vitro medical devices as set out in Directive 98/79/EC ([22]) and their amendments.		
(i) in medical devices as set out in Council Directive 93/42/EEC ([23]) and in vitro medical devices as set out in Directive 98/79/EC ([24]) and their amendments.		
(New addition)	***(j)*** **"work of art "products as set out in Council Directive 2001/84/EC"**	- LightingEurope asks to add the reference of the Directive 2001/84/EC of the European Parliament (work of art), to exclude from the scope items manufactured only in some pieces. - LightingEurope asks to add "work of art" to the list of exemptions of the Directive 2001/84/EC
For the purpose of this point, 'specifically tested and approved' means that the light source or separate control gear: - has been specifically tested for the mentioned operating condition or		

[18] OJ L 224, 21.8.2012, p. 1-85
[19] OJ L 191, 18.7.2008, p.1-45.
[20] OJ L 257, 28.8.2014, p. 146–185
[21] OJ L 169, 12.7.1993, p. 1
[22] OJ L331, 7.12.1998, p.1
[23] OJ L 169, 12.7.1993, p. 1
[24] OJ L331, 7.12.1998, p.1

application, according to the European legislation mentioned or related implementing acts, relevant Member State legislation, and/or relevant European or international standards, and - is accompanied by evidence, in the form of a certificate, a type approval mark, a test report or other documentation, that the product has been specifically approved for the mentioned operating condition or application, and - is placed on the market specifically for the mentioned operating condition or application, as evidenced at least by the technical documentation, and possibly by information on the packaging and/or in publicity.		
2. In addition, this Regulation shall not apply to: (a) double capped fluorescent T5 light sources with power P ≤ 13 W;		
(b) HID light sources with specific effective ultraviolet power >2 mW/klm;	(b) ~~HID~~ Light sources with specific effective ultraviolet power >2 mW/klm;	This is a valid exemption for all light sources. Due to the high UV output they are not allowed in general lighting but are used e.g. for sun tanning. DIN EN 61195:2015-10 Abschnitt 2.3
(c) HID light sources with colour temperature Tc > 7000 K;		
(d) light sources with a beam angle of less than 10˚;		
(e) electronic displays (e.g. televisions, computer monitors, notebooks, tablets, mobile phones, e-readers, game consoles), including but not limited to displays in scope of Commission Regulation (EU) No		

617/2013 ([25]), Commission Decision (EU) 2015/1402 ([26]), Commission Regulation (EC) No 642/2009 ([27]), Commission Decision (EU) 2016/1756 ([28]), European Commission COM(2015)178 ([29]);.		
(f) light sources and separate control gears in portable battery-operated products, including but not limited to e.g. torches, mobile phones with integrated torch light, toys including light sources, desk lamps operating only on batteries, armband lamps for cyclists, solar-powered garden lamps;	(f) light sources and separate control gears in ~~portable~~ battery-operated products, including but not limited to e.g. torches, mobile phones with integrated torch light, toys including light sources, desk lamps operating only on batteries, armband lamps for cyclists, solar-powered garden lamps;	Battery operated is the main part of this paragraph. The addition portable is not functional. Solar garden lights are not portable.
(g) light sources and separate control gears in bicycles and other non-motorized vehicles.		
(h)	(h) In addition, this Regulation shall not apply to: Colour-tuneable light source that can be set to at least the colours mentioned in table below and have for each of these colours, measured at the dominant wavelength, a minimum colour purity index according to table below: Colour Dominant wave-length range Minimum colour purity index Blue 440nm – 490nm 90% Green 520nm – 540nm 65% Red 610nm – 670nm 95%	 LEDs intended for colour applications typically require high colour saturation. These LEDs are not based on phosphor technology (conversion of light by means of a phosphor) as often used for light sources that are used for general lighting purposes.

[25] OJ L 175, 27.6.2013, p. 13
[26] OJ L 217, 18.8.2015, p.9 (office equipment, computers)
[27] OJ L 191, 23.7.2009, p.42 (televisions)
[28] OJ L 268, 1.10.2016, p.90 (office equipment, displays)
[29] COM(2015) 178 final, 22.4.2015 (related to self-regulatory initiative regarding game consoles)

		These (non-phosphor based) coloured LEDs can reach a very high colour saturation, called colour purity index. A colour point with a high colour purity index is located close to the locus of the colour space. So exempting products that could reach area close to the colour space locus would solve issue for theatre, studio, stage, architectural lighting applications. Colour purity index is defined using the following procedure: Draw a line from D65 reference point, going through your (x,y) chromaticity, and ending on the locus (outer line of the colour space). The full length of the line represents 100%. The distance between D65 and your (x,y) is then proportionally xx%, and defines your purity ratio. A point on the locus is then fully saturated (100% colour purity) whereas the D65 point has zero saturation (0% colour purity).

3. Any light source or separate control gear in scope of this Regulation shall be exempt from the requirements of Annex III, with the exception of the information requirements set out in Annex III point 3.5, if it has a specific technical design for its intended use in at least one of the following applications:	3. Any light source, control **gear or containing product** in scope of this regulation shall be exempt from the requirements of Annex III, ~~with the exception of the information requirements set out in Annex III point 3.5~~, if it has a specific technical design for its intended use ~~in at least one of the following application:~~ **and it is not designed for general lighting.** **For these light sources, control gear or containing products, the following information shall be clearly and prominently indicated on their packaging and in all forms of product information accompanying the lamp when it is placed on the market including advertisement:** **(a) their intended purpose; and** **(b) that they are not designed for general lighting; and** **(c) the technical parameters that make the lamp design specific for the stated intended purpose** **The technical documentation file drawn up for the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC 2005/32/EC shall list the technical parameter(s) that make the lamp design specific for the special purpose as indicated on the packaging.** **This exemption shall not be applicable to products placed on the market if the mentioned technical parameters for the specific special purpose application are also present in lamps with equivalent technical parameters while having higher energy efficiency classes according to Regulation (EU) No…** **Incandescent lamps longer than 60 mm are not exempted from Annex III, if they are resistant only to mechanical shock or**	**To avoid loopholes in exemptions and early ban of technologies with no LED replacement, a combined approach, which includes a non-exhaustive list of special purpose lamps (Annex Z) is proposed.**

	vibrations and are not intended for use as incandescent traffic signaling lamps (with a rated voltage above 60 V, and a failure rate of less than 2 % during the first 1 000 hours of operation.'); or they possess a rated power higher than 25 W. **See Annex Z: List of special purpose lamps**	
(a) signalling (including, but not limited to, road-, railway-, marine- or air traffic- signalling, traffic control or airfield lamps);		
(b) image capture and image projection (including, but not limited to, photocopiers and video projectors);	(b) **For light source > 2000LM Projection on objects (of images) and capture of images (including, but not limited to, photocopiers and video projectors studio and theatre lighting, architectural lighting>**	Present LED's used in these application (studio, theatre and architectural) cannot meet general lighting requirements as set in this draft regulation. This is due to the high loading of LEDs in order to get required light levels. In this way the present regulation will ban the use of LEDs in these applications. LightingEurope proposal maintains the exemptions of 1194 for these applications.
(c) ambient temperatures below -30°C or above 120°C.	(c) ambient temperatures below -30°C or above 120°C. **≤ 40W and < 60 mm length (should cover Oven lamps 15, 25, 40W in G9, E14 and P45 shape)**	- Ambient temperatures -30 and +120 degrees. The current description creates a large loophole and it allows incandescent and eco-halogen lamps. - Lot of exemptions are missing or not defined: - Clear Infrared Heat Lamps for Industry/ Animal care/ Food catering (is within 'white light' area) should remain allowed - Refrigerator, sewing machine, Microwave oven lamps (E14/ B15d) have been omitted - Halogen Capsules G4, GY6.35, G9 have been omitted; See text VHK of July 5th for example cooker hoods etc. Against Circular principles, without replacement the whole device might be replaced. - LightingEurope propose to write it clearer in this way: ambient temperatures only below -30°C or only above 120°C

(d)	**(d) See Annex Z for the exemptions**	General remark: A number of definitions can be taken out since they are not used anywhere in the regulation
ANNEX II – DEFINITIONS In addition to the definitions in Article 2, the following definitions apply for the purposes of this Regulation: (1) *'mains light source (MLS)*' means a light source that can be operated directly on the mains electricity supply. Light sources that can operate both directly on the mains, and indirectly on the mains using a separate control gear, shall be considered to be mains light sources.		
(2) '*non-mains light source (NMLS)*', means a light source that is not a mains light source. These light sources require a separate control gear to operate on the mains but they are placed on the market without such control gear.	(2) '*non-mains light source (NMLS)',* means a light source that is not a mains light source. These light sources require a separate control gear to operate on the mains. ~~**but they are placed on the market without such control gear.**~~	See proposal to avoid confusion - In the current framework and with this definition, a luminaire with a built-in control gear and a built-in light engine would be undecidable: The light source (here: light engine) is never placed on the market without separate control gear, but cannot be operated directly on the mains either. - It seems that the definitions of MLS and NMLS have been created using "light source" in a general way and not according to the definition in this regulation. - In case the part "but they are placed…" is removed, then the definition of what is a separate control gear decides whether something is a NMLS or a MLS. - - - - That's why it is important to define "integrated with" clearly, see definition of "separate control gear". - Related to comment "*is never placed on the market without separete control gear*,": how can this be justified? In future, Interoperable Light engines might be sold w/o control gear

(3) *'extra low voltage*' (ELV) means an electricity supply of less than 120 V direct current, as further defined in relevant standards.		
(4) *'directional light source*' (DLS) means a light source having at least 80% of total luminous flux within a solid angle of π sr (corresponding to a cone with angle of 120°)	(4) '*directional light source'* (DLS) means a light source having at least 80% of total luminous flux within a solid angle of π sr (corresponding to a cone with angle of 120°) **and intended to be used for accent lighting by the indication of the beam angle on the packaging and/or website.** **(according to ANNEX III – ECODESIGN REQUIREMENTS INFORMATION REQUIREMENTS FOR MANUFACTURERS AND IMPORTERS)** **Light sources may be declared as non-directional even if the total luminous flux within a solid angle of π sr is higher than 80%.**	The light distribution of some LED modules designed to be integrated into luminaires (without any intention by design to be directional) is close to the mentioned threshold between directional and not directional. There shall be some room for producers and importers whether to declare a light source to be directional or not when the product is very close to the threshold of 80%.
(5) '*non-directional light source*' (NDLS) means a light source that is not a directional light source.		
(6) *'connected light source'* (CLS) means a light source including data-connection parts that are physically or functionally inseparable from the light emitting parts to maintain the 'reference control settings.'. To maintain the reference control settings the data-connection parts cannot be disconnected, switched-off or their power consumption minimised. The light source can have physically integrated data-connection parts in a single inseparable housing, or the light source can be combined with physically separate data-connection parts placed on the market as a single product.	*(6)* ***'connected device'*** **(CD) means a light source or a separate control gear** including data-connection parts that are physically or functionally inseparable from the light emitting parts **or the separate control gear** to maintain the 'reference control settings.' ~~To maintain the reference control settings the data-connection parts cannot be disconnected, switched-off or their power consumption minimised.~~ The light source can have physically integrated data-connection parts in a single inseparable housing, or the light source can be combined with physically separate data-connection parts placed on the market as a single product.	- It is unclear why only light sources with data connection parts are defined here; no similar definition for separate control gear implemented in the regulation. - Delete 'connected light source' and replace it with 'connected device'.

(7) '*data-connection parts'* means parts that perform one of the following functions: – reception or transmission of wired or wireless data signals and the processing thereof (either used to control the light emission function or otherwise), – sensing and processing of the sensed signals (either used to control the light emission function or otherwise), – actuation by audio control (including voice control), – a combination of these.		
(8) *'colour-tuneable light source'* (CTLS) means a connected light source (CLS) using LED or OLED technology, that can be set to emit light with a large variation of colours outside the range defined in article 2 (1)(a), but can also be set to emit white light inside the range defined in article 2 (1)(a) for which the light source is in scope of this Regulation. The term does not include tuneable-white light sources that can only be set to emit light, with different colour temperatures, within the range defined in article 2 (1)(a). The term also does not include dim-to-warm light sources, that shift their white light output to lower colour temperature when dimmed, simulating the behaviour of incandescent light sources.	**(8)** *'colour-tuneable light source'* (CTLS) means a ~~connected~~ **light source ~~(CLS) using LED or OLED technology,~~** that can be set to emit light with a large variation of colours outside the range defined in article 2 (1)(a), but can also be set to emit white light inside the range defined in article 2 (1)(a) for which the light source is in scope of this Regulation. The term does include tuneable-white light source that ~~can only be set to emit light, with different colour temperatures, within the range defined in article 2 (1)(a).~~ **allows a continuous tuneable white with more than 2000 K variation in CCT.** The term also does not include dim-to-warm light sources**, that shift their white light output to lower colour temperature when dimmed, simulating the behaviour of incandescent light sources**	A CTLS is not necessarily a connected light source. It could also be a light source without data connection, just having multiple power inputs for multiple LED-channels
(9) *'lighting control parts'* means parts that are integrated in a light source or in a separate control gear, or physically separated but marketed together with a	(9) *'lighting control parts'* means parts that are integrated in a light source or in a separate control gear, or physically separated but marketed together with a light source or	In order to avoid that a lighting control part that is mounted in or on a luminaire is considered as marketed together with light source or control gear, a separate statement should be made to make this

light source or separate control gear as a single product, that are not strictly necessary for the light source to emit light at full-load, or for the separate control gear to supply the electric power that enables light source(s) to emit light at full-load, but that enable manual or automatic, direct or remote, control of luminous intensity, chromaticity, colour temperature, light spectrum and/or beam angle. Dimmers shall also be considered as lighting control parts. The term also includes data-connection parts, but the term does not include products within the scope of Commission Regulation (EC) No 1275/2008[30].	separate control gear as a single product, that are not strictly necessary for the light source to emit light at full-load, or for the separate control gear to supply the electric power that enables light source(s) to emit light at full-load, but that enable manual or automatic, direct or remote, control of luminous intensity, chromaticity, colour temperature, light spectrum and/or beam angle. Dimmers shall also be considered as lighting control parts. **Products in a containing product are not considered marketed together.** The term also includes data-connection parts, but the term does not include products within the scope of Commission Regulation (EC) No 1275/2008[30] .	clear. This is due to avoid that sensor and communication devices that are intended to be connected to a control gear, are marketed together while they might be from separate manufacturers assembled by luminaire manufacturer in a luminaire.
(10) *'non-lighting parts'* means parts that are integrated in a light source or in a separate control gear, or physically separate but marketed together with a light source or separate control gear as a single product, that are not necessary for the light source to emit light at full-load, or for the separate control gear to supply the electric power that enables connected light source(s) to emit light at full-load, and that are not 'lighting control parts'. Examples include, but are not limited to: speakers (audio), cameras, repeaters for communication signals to extend the range (e.g. WiFi), parts supporting grid balance (switching to own internal batteries when necessary), battery charging, visual notification of events (mail arriving, door bell ringing, alert), use of Light Fidelity (Li-Fi, a bidirectional, high-speed and fully		

[30] OJ L 339, 18.12.2008, p. 45 and later amendments.

networked wireless communication technology)		
(11) *'useful luminous flux'* (Φuse), means the part of the luminous flux of a light source that is considered when determining its energy efficiency: – For non-directional light sources it is the total flux emitted in a solid angle of 4π sr (corresponding to a 360˚ sphere). – For directional light sources with beam angle ≥ 90° it is the flux emitted in a solid angle of π sr (corresponding to a cone with angle of 120°). – For directional light sources with beam angle < 90° it is the flux emitted in a solid angle of 0.586π sr (corresponding to a cone with angle of 90°).		
(12) *'beam angle'* of a directional light source means the angle between two imaginary lines in a plane through the optical beam axis, such that these lines pass through the centre of the front face of the light source and through points at which the luminous intensity is 50 % of the centre beam intensity, where the centre beam intensity is the value of luminous intensity measured on the optical beam axis. For light sources that have different beam angles in different planes, the largest beam angle shall be considered. For light sources with user-controllable beam angle, the beam angle corresponding to the 'reference control setting' shall be considered.		
(13) *'full-load'* means:		

– the condition of a light source, within the declared operating conditions, in which it emits the maximum (undimmed) initial luminous flux, or – the operating conditions and loads of the control gear under efficiency measurement as specified in the relevant standards.		
(14) *'no-load mode'* means the condition of a separate control gear in which its input is connected to the mains power source and its output is disconnected from light sources, and, if applicable, from data-connection parts, lighting control parts and non-lighting parts. If these parts cannot be disconnected, they shall be switched off or their power consumption shall be minimized following the manufacturer's instructions.	(14) *'no-load mode'* means the condition of a separate control gear in which its input is connected to the mains power source and its output is **intendedly** disconnected from light sources, and, if applicable, from data-connection parts, lighting control parts and non-lighting parts. If these parts cannot be disconnected, they shall be switched off, **and** their power consumption shall be minimized following the manufacturer's instructions. **Control gears that are not designed for no-load mode, shall not be tested in no-load mode.** **Accidental disconnection of a light source or a connected damaged light source is not regarded as 'no-load mode'. Manufactures/importers shall indicate if a control gear is intended to operate in 'no-load mode' in section 3.2.2.d)**	No-load mode requirement shall only apply to the control gear, which is intended to be used in the no-load mode. Majority of the LED control gear are not intended to be used in no-load mode and therefore need not to comply 0,5W requirement.
(15) *'standby mode'* means the condition of a light source or of a separate control gear, where it is connected to the power supply but the light sources are intentionally not emitting light, and the light source or control gear is awaiting a control signal to return to a state with light emission. Lighting control parts enabling the standby function shall be in their control mode. Non-lighting parts shall be disconnected or switched off or	(15) *'standby mode'* means the condition of a light source or of a separate control gear, where it is connected to the power supply, but the light sources are intentionally not emitting light~~., and the light source or control gear is awaiting a control signal to return to a state with light emission.~~ Lighting control parts enabling the standby function shall be in their control mode. Non-lighting parts ~~shall be~~ **are** disconnected or switched-off or their	- It is not always possible to minimize the power consumption from non-lighting parts. - Do not agree to include separate lighting control parts t in the standby power. Reason: The separate control devices to be connected to the control gear are placed on the market separately and there may by many different kind of control devices available depending on the application. The requirement shall not be different from 245. Control devices shall be regulated separately later (in lighting systems).

their power consumption shall be minimized following manufacturer's instructions.	power consumption ~~shall be~~ **is** minimized following manufacturer's instructions.	
(16) *'networked standby mode'* means the condition of a connected light source (CLS) where it is connected to the power supply but the light source is intentionally not emitting light, and is awaiting a remotely initiated trigger to return to a state with light emission. Lighting control parts shall be in their control mode and data-connection parts shall be in a state enabling the networked standby function. Non-lighting parts shall be disconnected or switched off or their power consumption shall be minimized following manufacturer's instructions.	(16) *'networked standby mode'* means the condition of a connected light source (CLS) **or a connected control gear** where it is connected to the power supply but the light source is intentionally not emitting light **or the control gear does not supply the electric power that enables light source(s) to emit light,** and is awaiting a remotely initiated trigger to return to a state with light emission. Lighting control parts shall be in their control mode and data-connection parts shall be in a state enabling the networked standby function. Non-lighting parts shall be disconnected or switched off or their power consumption shall be minimized following manufacturer's instructions.	Added connected control gear to definition to synchronise definitions for light sources with control gear.
(17) *'control mode'* means the condition of lighting control parts where they are connected to the light source and/or to the separate control gear and performing their functions in such a way that a lighting control signal can be internally generated or an external control signal can be received, by wire or wireless, and processed to lead to a change in the light emission of the light source or to a corresponding desired change in the power supply by the separate control gear.		
(18) *'control signal'* means an analogue or digital signal transmitted to light source or separate control gear wirelessly or wired either via voltage modulation in		

separate control cables or via a modulated signal in the supply voltage.		
(19) *'remotely initiated trigger'* means a signal that comes from outside the light source or separate control gear via a network.		
(20) '*network*' means a communication infrastructure with a topology of links, an architecture, including the physical components, organisational principles, communication procedures and formats (protocols).		
(21) *'on-mode power'* (Pon), expressed in Watt, is the electric power consumption of a light source in full-load with all lighting control parts and non-lighting parts disconnected. If these parts cannot be disconnected they shall be switched off or their power consumption shall be minimised following manufacturer's instructions. In case of a non-mains light source (NMLS) that requires a separate control gear to operate, Pon can be measured directly on the input to the light source, or Pon is determined using a control gear with known efficiency, whose electric power consumption is subsequently subtracted from the measured mains power input value.		
(22) *'no-load power'* (Pno), expressed in Watts, is the electric power consumption of a separate control gear in no-load mode.	(22) *'no-load power'* (Pno), expressed in Watts, is the electric power consumption of a separate control gear in no-load mode. **No-load power is only applicable to control gear intended to be operated in no-load mode. When this is an intended operation condition, this should be explicitly mentioned in technical file.**	The proposed definition for "no-load mode" (see comments there) already comprises that only control gear intended to operate in no-load are concerned.
(23) *'standby power'* (Psb), expressed in Watts, is the electric power consumption	(23) 'standby power' (P_{sb}), expressed in Watts, is the electric power consumption of a light source or of a separate control gear in	**-** The consumption means the power consumed by the control gear. The power transmitted by the control gear to e.g. non-lighting pars or network

of a light source or of a separate control gear in standby mode.	standby mode. **The power consumption of physically separated lighting control parts shall be deducted or minimized following manufacturer's instructions, preserving that the control gear or light source remain in standby mode.**	connections is not consumed in the control gear and therefore not included. - "Lighting control parts" being integrated in light sources or control gear shall not be regarded differently as "lighting control parts" being operated separately. - It should be considered that in most cases lighting control parts being integrated in light sources or control gear use less energy than separate independent lighting control parts due to the fact of reduced power conversion losses. - Lighting control parts heavily support easy installation and the efficient usage of energy. - Moreover, an alignment of the definition with international standards IEC 62442 for standby power measurement of control gear is beneficial to avoid ambiguities.
(24) *'networked standby power'* (Pnet), expressed in Watts, is the electric power consumption of a connected light source in networked standby mode.	(24) *'networked standby power'* (Pnet), expressed in Watts, is the electric power consumption of a connected light source or a connected control gear in networked standby mode. **The power consumption of physically separated lighting control parts shall be deducted or minimized following manufacturer's instructions, preserving that the control gear or light source remain in standby mode.**	LightingEurope asks to add connected control gear and the second sentence to avoid that sensors connected to control gear would be included in standby power.
Definition of *'connected control gear'*	***A new point is proposed*** ***(24a) 'connected control gear'* means a control gear including data-connection parts that are physically or functionally inseparable from the control gear. The control gear can**	New definition needed to align networked standby definition with connected light source. This definition derived from connected light source definition in which the non-control gear relevant parts are removed.

	have physically integrated data-connection parts in a single inseparable housing, or the control gear can be combined with physically separate data-connection parts placed on the market as a single product.	
(25) *'reference control settings'* means a control setting or a combination of control settings that is used to verify compliance of a light source with this Regulation. These settings are relevant for light sources that allow the end-user to control, manually or automatically, directly or remotely, the luminous intensity, colour, colour temperature, spectrum, and/or beam angle of the emitted light. The reference control settings shall be those predefined by the manufacturer as factory default values, and encountered by the user at first installation (out-of-the-box values). If the installation procedure foresees an automatic software update during first installation, or if the user has the option to perform such an update, the resulting change in settings (if any) shall be taken into account. The light source manufacturer shall define the reference control settings such that: – the light source is in scope of this Regulation according to Art.2(1) and none of the conditions for exemption of Annex I applies (if this is not possible, the light source is out-of-scope or exempted);	*(25) 'reference control settings'* means a control setting or a combination of control settings that is used to verify compliance of a light source with this Regulation. These settings are relevant for light sources that allow the end-user to control, manually or automatically, directly or remotely, the luminous intensity, colour, colour temperature, spectrum, and/or beam angle of the emitted light. The reference control settings shall be those predefined by the manufacturer as factory default values, and encountered by the user at first installation (out-of-the-box values). **If the out of the box value is deliberately set differently from the reference control setting (e.g. at low power for safety purposes), the manufacturer shall indicate in the technical documentation how to recall the reference control settings for compliance verification.**	With LED product it is becoming more common that supplied product is adjusted to the user requirements before supply to ease installation and commissioning. Therefore "out-of-the-box" values are not necessarily standard for a product and for these products the definition for reference control setting will be unnecessarily burdensome for manufacturers. In the absence of clarity on whether this regulation applies just for products sold directly to the end user or also covers the professional market the use of default values which are those supplied unless specified by a user would be preferable. - The reference setting might be deliberately set at low power for safety purposes at the products first use (high power sources). In this case it should be possible to deviate, and indicate in the technical documentation how to obtain maximum load. - Is the light source manufacturer intentionally added or is manufacturer enough? - LED luminaires are supplied in multiple variations, i.e. their light sources operated at various currents: most pragmatic approach is to verify the light source at a reference setting i.e. a predefined max load (eg 500mA) which is not necessarily the technically max load on the light source (eg 700mA). This max load is then the reference setting to be verified. Is this the correct interpretation? And if so, reference setting to be retrieved from the place where the light sources are registered: where is this?

– the power consumption of lighting control parts and non-lighting parts is minimal (if these parts cannot be disconnected or switched-off); – the full-load condition is obtained (maximum initial luminous flux given the other chosen settings); – when the end-user opts to reset factory defaults, the reference control settings are obtained.		- It is a significant limitation for many applications if the out of the box properties have to be in a specific way (e.g. full load condition)
(26) *'high-pressure mercury light source'* means a high intensity discharge light source in which the major portion of light is produced, directly or indirectly, by radiation from predominantly vaporized mercury operating at a partial pressure in excess of 100 kilopascals.		
(27) *'high-pressure sodium light source'* (HPS) means a high intensity discharge light source in which the light is produced mainly by radiation from sodium vapour operating at a partial pressure of the order of 10 kilopascals. HPS light sources may have one ('single-ended') or two ('double-ended') connectors to their electricity supply.		
(28) *'metal halide light source'* (MH) means a high intensity discharge light source in which the light is produced by radiation from a mixture of metallic vapour, metal halides and the products of the dissociation of metal halides. MH light sources may have one ('single-ended') or two ('double-ended') connectors to their electricity supply. The material for the arc tube of MH light sources can be quartz (QMH) or ceramic (CMH).		
(29) *'compact fluorescent light source'* (CFL) means a single-capped fluorescent light source with a bent-tube construction		

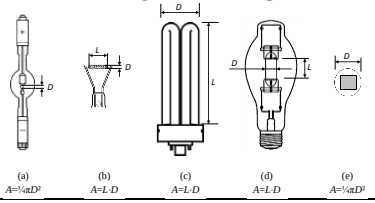
	designed to fit in small spaces. CFLs may be primarily spiral-shaped (i.e. curly forms) or primarily shaped as connected multiple parallel tubes, with or without a second bulb-like envelope. CFLs are available with (CFLi) or without (CFLni) physically integrated control gear.		
(30)	*'T2', 'T5', 'T8', 'T9' and 'T12'* means a tubular light source with diameter of approximately 7, 16, 26, 29 and 38 mm respectively, as defined in harmonised standards. The tube can be straight (linear) or bent (e.g. U-shaped, circular).		
(31)	*'LFL T5-HE'* means a high-efficiency linear fluorescent T5 light source with driving current lower than 0.2 A.		
(32)	*'LFL T5-HO'* means a high-output linear fluorescent T5 light source with driving current higher than or equal to 0.2 A.		
(33)	*'LFL T8 2-foot', 'LFL T8 4-foot' or 'LFL T8 5-foot'* means a linear T8 fluorescent light source with a length of approximately 600 mm (2 feet), 1200 mm (4 feet) or 1500 mm (5 feet) respectively, as defined in standards.		
(34)	*'magnetic induction light source'* means a light source using fluorescent technology, where energy is transferred to the gas discharge by means of an induced high-frequency magnetic field, instead of using electrodes placed inside the gas discharge. The magnetic inductor can be external or internal to the shape of the discharge tube.		
(35)	*'G4'*, '*GY6.35'* and *'G9'* means an electrical interface for a light source consisting of two small pins at distances of 4, 6.35 and 9 mm respectively, as defined in standards.		

(36) *'HL R7s'* is a mains-voltage, double capped, linear halogen light source with a cap-diameter of 7 mm.		
(37) *'portable battery-operated* product' means a containing product that is not permanently fixed to its surroundings, that is intended to be carried around or to be frequently moved, whose position can be changed by a simple manual pick-and-place operation, and that operates only on direct current (DC) with a voltage of less than 24 V supplied from a source contained in the same product, without being connected directly or indirectly to the mains electricity supply.	(37) **'*battery-operated product*'** means a containing product **that operates only on direct current (DC) with a voltage of 24 V or less supplied from a source contained in the same product, without being connected directly or indirectly to the mains electricity supply.**	*Portable* is not essential Cross-reference: pt. (1)(f) of Annex I
(38) *'second envelope'* means a second outer envelope on a HID light source that is not required for the production of light, such as an external sleeve for preventing mercury and glass release into the environment in case of lamp breakage. In determining the presence of a second envelope, the HID arc tubes shall not count as an envelope.		
(39) *'non-clear envelope'* for a HID light source means a non-transparent outer envelope or outer tube in which the light producing arc tube is not visible.		
(40) *'anti-glare shield'* means a mechanical or optical reflective or non-reflective impervious baffle designed to block direct visible radiation emitted from the light emitter in a directional light source, in order to avoid temporary partial blindness (disability glare) if viewed directly by an observer. It does not include surface coating of the light emitter in the directional light source.		
(41) *'control gear efficiency'* is the output power divided by the input power of a	(41) *'control gear efficiency'* is the output power divided by the input power of a separate	- It is not always possible to minimize or switch off these loads.

separate control gear in conditions defined in measurement standards, with any lighting control parts and non-lighting parts disconnected, switched off or set to minimum power consumption according to manufacturer's instructions.	control gear in conditions defined in measurement standards, **as obtained by measuring methods and conditions by the relevant standards, with any power to lighting control parts and non-lighting parts disconnected, switched off or deducted from the result.**	- To be more exact and advice that the efficiency should be determined as given in standards which is simply division of the output power by input power. Determining efficiency of electronic control gear for fluorescent lamps involves luminous flux measurement and some cathode heating power may be excluded from the output power. With conventional HID only the losses of the control gear are measured. It is intended that the same methods are used as up to now.
(42) *'functionality after accelerated endurance testing'* means the functionality of a LED or OLED light source or of a separate control gear for LED or OLED light sources after accelerated endurance testing as defined in Annex V.		
(43) *'Pst LM'* is the metric for flicker used in this Regulation where 'st' stands for short term and 'LM' for light flickermeter method, as defined in standards. A value Pst LM=1 means that the average observer has a 50% probability of detecting flicker.		See comments about functional requirements.
(44) *'declared value'* for a parameter means the value given by the manufacturer or importer in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC.	***Propose to delete (44) and move to Art. 2(19)*** ~~*'declared value'* for a parameter means the value given by the manufacturer or importer in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC.~~	'*declared value*' has been used throughout text and it needs to be mentioned earlier.
(45) *'specific effective radiant ultraviolet power'* (mW/klm) means the effective power of the ultraviolet radiation of a light source weighted according to the spectral correction factors and related to its luminous flux.		
(46) *'luminous intensity'* (candela or cd) means the quotient of the luminous flux leaving the source and propagated in the		

element of solid angle containing a given direction, by the element of solid angle.		
(47) *'colour temperature'* (Tc [K]) means the temperature of a Planckian (black body) radiator whose perceived colour most closely resembles that of a given stimulus at the same brightness and under specified viewing conditions.		
(48) *'colour consistency'* means the maximum deviation of the initial (after a short period of time), spatially averaged chromaticity coordinates (x and y) of a single light source from the chromaticity centre point (cx and cy) declared by the manufacturer or the importer, expressed as the size (in steps) of the MacAdam ellipse formed around the chromaticity centre point (cx and cy).	(48) '*colour consistency'* means the maximum deviation of the initial (after a short period of time), spatially averaged chromaticity coordinates (x and y) of a single light source from the chromaticity centre point (cx and cy) declared by the manufacturer or the importer, expressed as the size (in steps) of the MacAdam ellipse formed around the chromaticity centre point (cx and cy). **Manufacturer shall define the centre point of chromaticity coordinates (cx and cy) with a measurement uncertainty less than or equal to 0.005.'**	- The centre point of chromaticity can only be defined considering the typical measurement uncertainty. Interlaboratory comparison results demonstrate 0.005 uncertainty threshold is needed to avoid ambiguity on the assessments. (https://ssl.iea-4e.org/files/otherfiles/0000/0067/IC2013_Final_Report_final_10.09.2014a.pdf - LED suppliers already are defining their product specs considering this uncertainty threshold.
(49) *'displacement factor (cos φ1)'* means the cosine of the phase angle φ1 between the fundamental harmonic of the mains supply voltage and the fundamental harmonic of the mains current. It is used for mains light sources using LED- or OLED-technology. The displacement factor is measured at full-load, for the reference control settings where applicable, with any lighting control parts in control mode and non-lighting parts disconnected, switched off or set to minimum power consumption according to manufacturer's instructions.		
(50) *'lumen maintenance factor'* (LMF) means the ratio of the luminous flux emitted by a	(50) ***'lamp lumen maintenance factor'*** (LLMF) means the ratio of the luminous flux emitted	The correct name is "lamp lumen maintenance factor" (LLMF). This to avoid confusion with LMF = Luminaire Maintenance Factor

light source at a given time in its life to the initial luminous flux.	by a light source at a given time in its life to the initial luminous flux.	
(51) *'survival factor'* (SF) means the defined fraction of the total number of light sources that continue to operate at a given time under defined conditions and switching frequency.		
(52) *'lifetime'* for LED and OLED light sources means the time in hours between the start of their use and the moment when 50% of a population of light sources have either abruptly failed (no light output anymore) or their light output has gradually degraded to a value below 70% of the initial luminous flux. This is also referred to as the $M_{70}F_{50}$ lifetime.	(52) *'lifetime'* for LED and OLED light sources means the time in hours between the start of their use and the moment when 50% of a population of light sources ~~have either abruptly failed (no light output anymore) or their light output~~ has gradually degraded to a **light output** value below **a specified (e.g. 70%)** of the initial luminous flux **(median useful life).** This is also referred to as the **L70** ~~M70F50~~ lifetime.	- This should be aligned to IEC 62717
(53) *'equivalent model'* means a model with the same relevant technical and performance characteristics as another model placed on the market under a different commercial code.		
(54) *'end-user'* means a natural person buying or expected to buy a product for purposes which are outside his trade, business, craft or profession;		
(55) *'projected light-emitting surface area (A)'* is the surface area in mm^2 (square millimetres) of the view in an orthographic projection of the light-emitting surface from the direction with the highest light intensity, where the light-emitting surface area is the surface area of the light source that emits light with the declared optical characteristics, such as the approximately spherical surface of an arc (a), cylindrical surface of a filament coil (b) or a gas discharge lamp (c, d), flat or	*Addition*: **The HID lamps fall under definition 55(a) unless the dimensions defined in 55(d) apply with L>D In 55(d) L is the distance between the electrode tips and D the inner diameter of the arc tube**	- Lighting manufacturers need to know exactly under what conditions they can approximate the shape of an arc with a spherical surface. This could particularly be relevant in case of the so-called 'single ended short arc quartz metal halide discharge lamps' that used in showbiz applications. For these lamp types it makes a significant difference whether lighting manufacturers use definition (a) or (d) for luminous flux per projected light-emitting surface area.

semi-spherical envelope of a light-emitting diode (e). For light sources with a non-clear envelope or with anti-glare shield, the light-emitting surface area is the entire area through which light leaves the light source. For light sources containing more than one light emitter, the smallest gross volume enveloping all emitters shall be taken as the light-emitting surface.  (a) $A=\frac{1}{4}\pi D^2$ (b) $A=L \cdot D$ (c) $A=L \cdot D$ (d) $A=L \cdot D$ (e) $A=\frac{1}{4}\pi D^2$		
(57)	(56) **"*high-luminance light source*" means a light source comprising one or more discrete light emitting elements, each having a luminous emittance greater than 100/R lm/mm2, based on the projected light-emitting surface area A from definition (55), where R=(CRI+80)/160"**	High-luminance light sources (e.g. undomed high-power LEDs) need to be defined as they are a key element for directional light sources. They generally have an efficacy penalty at source level but enable higher light use efficiency (and hence net energy savings) through better optical control based on their small source size.
ANNEX III – ECODESIGN REQUIREMENTS **1. ENERGY EFFICIENCY REQUIREMENTS** **1.1. Light sources** The declared power consumption of a light source at full-load Pon shall not exceed the maximum allowed power Ponmax (in W), defined in function of the declared useful luminous flux Φuse (in lm) and the declared colour rendering index CRI (in Ra) as follows: Ponmax = C * (L + Φuse / (F*η)) * R		

Where: - The values for threshold efficacy (η in *lm*/*W*) and end loss factor (L in *W*) are specified in Table 1, depending on the light source type. - Basic values for correction factor (C) depending on light source type, and additions to C for special light source features are specified in Table 2. - Efficacy factor (F) is: 1.00 for non-directional light sources (NDLS, using total flux) 0.85 for directional light sources (DLS, using flux in a cone) - CRI factor (R) is: 0.65 for CRI ≤ 25 (CRI+80)/160 for CRI > 25	*We propose following addition*: **Note: threshold efficacy (η in lm/W) and end loss factor (L in W) are variables used for calculation purposes only and do not reflect true parameters of e.g. LED light sources**	- We suggest changing the names used in energy efficiency requirement equation, such as 'end loss factor' and 'efficacy limit,' because they are only fit parameters without clear physical meaning, and may cause confusion for some lamp families.
FL T8 other than LFL 2-, 4- and 5-foot (incl. FL T8 U-shaped) *Link to table 1 below*	***We propose to allow these products after stage 1 see proposal next to coefficients table below***	- According to the proposal from VHK the ban was proposed in 2021. This was already too early. - Suitable LED replacement lamps are not (yet) available for all T8 lamps. 1. light distribution 2. light output 3. weight 4. dimming 5. compatibility with existing control gear and heat management. - Many customers do a rewiring that is needed to eliminate the losses of the existing control gear in installed luminaires can only be done safely by certified installers. - Too early banning these lamps from the market would therefore force customers to replace complete luminaires and lighting systems in case LED lamps replacements are not available yet with related high cost and an increase of the waste stream.
Halogen lamps *Link to table 1 below*	***We propose to allow these products after stage 1 see proposal next to coefficients table below***	- According to VHK there are no suitable replacement products for G4, GY 6.35, in their proposal the ban was intended for a year later.

		- There is new evidence found in reference to VHK document published July this year: VHK has studied catalogue* values of suppliers and based on that concluded that for the following categories there aren't LED alternatives available (details in attachment): • R7s. • MV capsules (G9 cap). • LV capsules (G4, GY6.35 caps). • LV DLS (MR11-GU4, MR16-GU5.3, AR111-G53). The VHK expectation is that per Sept 1st 2021 progress in LED technology will enable alternatives in the same dimensions for: • R7s > 2700 lm (i.e. alternative solution by integrated builder spots, thus not by direct lamp replacement). The LE reply to VHK was that lm boundary should be 5500lm. For R7s ≤ 2700 lm VHK expects no alternative possible after 2021. This is recognized in the EU proposal. • G9 up to 900lm. LE commented to VHK this is too optimistic • G4, GY6.35 up to 900lm. Same LE comment. • MR11 up to 350-400lm. Same LE comment. • MR16 >900lm. Same LE comment. • AR111. * Not taken into account is the current (halogen) industry practice of using tolerances for information declaration (see note 5 in EU2016/2282) G9 LED lamps are not (and will never be) available in the same shape as HAL lamps. For this reason, for existing consumer;s luminaires will become worthless. We ask to keep the exemption from the 244/2009 for G9 lamps.
Table 1: threshold efficacy (η) and end loss factor (L) Light source description | **η** | **L**	**- We propose to *change requirements for T8 lamps to include also 2-, 4- and 5-foot lamps as proposed earlier*:**	LightingEurope requested the renewal of exemptions 1(a-g) under RoHS for CFL and other fluorescent lamps.

	[lm/W]	*[W]*
LFL T5-HE	**98,8**	**1,9**
LFL T5-HO, 4000≤Φ≤5000 *lm*	**83**	**1,9**
LFL T5-HO, other *lm* output	**79**	**1,9**
FL T5 circular	**79**	**1,9**
FL T8 other than LFL 2-, 4- and 5-foot (incl. FL T8 U-shaped)	**89,7**	**4,5**
FL using magnetic induction, any length/flux	**70,2**	**2,3**
CFLni	**70,2**	**2,3**
FL T9 circular	**71,5**	**6,2**
HPS single-ended	**88**	**50**
HPS double-ended	**78**	**47,7**
MH ≤ 405 *W* single-ended	**84,5**	**7,7**
MH > 405 *W* single-ended	**79,3**	**12,3**
MH ceramic double-ended	**84,5**	**7,7**
MH quartz double-ended	**79,3**	**12,3**
Organic light-emitting diode (OLED)	**65**	**1,5**
HL R7s ≤ 2700 lm	**26**	**13**
Other light sources in scope not mentioned above	**120**	**1,5***

* For connected light sources (CLS) a factor L=2.0 shall be applied.

FL T8 linear, 4-foot with 3000<Φ≤3500 *lm*	**104**	**4,5**
FL T8 linear, other length or flux & FL T8 U-shaped	**89,7**	**4,5**

We propose adding following Halogen categories with parameters that allow compliance with the new tolerances:
-HL MV and LV capsules (G9, G4, GY6.35)
- HL LV DLS (MR11-GU4, MR16-GU5.3, AR111-G53)
- HL R7s > 5500 lm..

Connected LED products, LED strips, >2000 lm RGB products:

Light source description	**η**	**L**
	[*lm/W*]	**[*W*]**
Connected LED Light Source	**80**	**2**

Adjust the energy efficient requirement to cover these connected LED products.
This can be achieved in two ways:

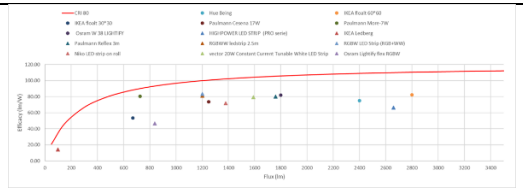
1) An additional bonus on C for Connected Light Sources:

Special light source feature	**Bonus on C**
Connected Light Source	C+0,5

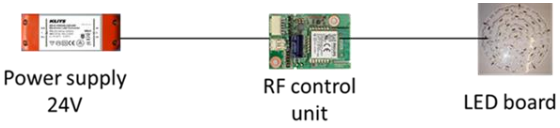
2) Alternatively, one could consider defining Connected Light sources as a special light source, with proposed L and η as below (in a parallel to OLED):

Light source description	**η**	**L**
	[*lm/W*]	[*W*]
Connected LED Light Source	**80**	**2**

- Detailed motivation:
Although “ANNEX VI – BENCHMARKS” describes efficiency benchmarks for LED products, it misses to consider connected light sources. Also, it seems benchmarking has focused on retrofit LED lamps, and excluded tunable luminaires and LED strips with typical much higher fluxes. Below figure illustrates a set of connected white and color tunable LED luminaires and strips for different vendors available on the market, plotted versus the energy efficiency requirement. It shows that none of the products meets the energy efficiency requirement (for connected light sources), which is plotted by the red line.
Detailed list of the product is given below.



- All these solutions the following architecture, of a DC PSU (either 12 or 24 V), a connected lighting controller and an LED board (rigid or in flex strip).



- The architecture, which is used industry-wide for the tunable LED Strips and luminaires, does not allow significant scaling of efficiency with fluxes above 400 lm;
- Has the following key characteristics:
  - Natural resource efficient approach versus using multiple retrofit connected lamps with lower flux light sources (“lamps”), having less environmental impact; E.g. instead of using 10 retrofit lamps of 400lm, one LED board, controller and LED board can be used.
  - Cost effective solution, while achieving best in class efficiency (comparable with multiple lamps);
  - User-cuttable to length or extendable and safe for LED strips;
- The products do achieve additional energy efficiency (beyond the use of LED) through system control, i.e. dimming, switching off based on timers/sensors;

- Halogen categories:

Set the threshold levels for η and L such that in combination with the new approach for tolerances extremely compact halogen remains viable. (see

		"whereas" item 5 in EU2016/2282 on current halogen industry practice of using tolerances for information declaration). - There are no limit values for T8 LFL 2, 4 and 5 foot (18, 36 and 58 W). - These lamps will be phased out. However with proper control gear the efficacy is equal or even better (from 54W upwards) than T5 (high output). - Should not T8 and T5 technologies be treated in the same manner? - Halogen G9 and LV Capsules shouldn't be phased out from the market until true LED retrofit lamps are available, otherwise a complete system change will be required which goes against the circular economy**.** - Change requirements T8 lamps to include also 2-, 4- and 5-foot lamps as proposed earlier: FL T8 linear, 4-foot with 3000<Φ≤3500 *lm* — **104** — **4,5** FL T8 linear, other length or flux & FL T8 U-shaped — **89,7** — **4,5**
Table 2: Correction factor C depending on light source characteristics **Light source type** / **Basic C value** Non-directional (NDLS) not operating on mains (NMLS) — 1 Non-directional (NDLS) operating on mains (MLS) — 1,08 Directional (DLS) not operating on mains (NMLS) — 1,15 Directional (DLS) operating on mains (MLS) — 1,23	***We propose to add further light source features to the correction factor table*** **Special light source feature** / **Bonus on C** **FL or HID with Tc >5000 *K*** — **C+0,1** **FL with CRI > 90 *Ra*** — **C+0,1** **HID with second envelope** — **C+0,1** **MH NDLS >405 W with non-clear envelope** — **C+0,1** **DLS with anti-glare shield** — **C+0,2** **Colour-tuneable light source** — **C+0,1**	

Special light source feature / **Bonus on C** FL or HID with Tc >5000 *K* — C+0,1 FL with CRI > 90 *Ra* — C+0,1 HID with second envelope — C+0,1 MH NDLS >405 W with non-clear envelope — C+0,1 DLS with anti-glare shield — C+0,2 Colour-tuneable light source (CTLS) — C+0,1	**(CTLS)** **ingress protected light sources (≥IP67); e.g. sealed LED strips** — **C+0.2** **ingress protected light sources (≥IP67); with integrated diffusor sealed LED strips** — **C+0.5** **High-luminance light source** — **C+0.5**	
Where applicable, bonuses on correction factor C are cumulative.		
For CTLS (that in this Regulation per definition are CLS), the bonus on factor C applies together with the higher value for L.	*Add the following sentence:* For large dimensioned and scaleable LS (e.g. LED strips, LED modules chains) the Pon requirement shall be evaluated according to performance standard. (e.g. IEC/EN 62717 § 6.1)	- Large dimensioned products can't be reasonably tested in standard laboratory equipment.
Light sources that allow the end-user to adapt the spectrum and/or the beam angle of the emitted light, thus changing the values for useful luminous flux, CRI and/or colour temperature (Tc), and/or changing the DLS/NDLS status, shall be evaluated using the reference control settings, at full-load. The standby power of a light source P_{sb} shall not exceed 0.5 *W*	The standby power of **a LED** light source Psb shall not exceed 0.5 W**. For HID and fluorescent lamp systems Psb shall not exceed 1.5W**	The standby power of control gear for conventional lamps does not always meet the 0.5 W. To be able to service installations with HID and fluorescent lamps and control gear (Circular economy) the standby power requirement of 0.5W should be limited to control gear for LED.
The networked standby power of a connected light source P_{net} shall not exceed 0.5 *W*		**- need to clarify** the net worked standard by power means for P net 0.5W. - Does that mean for net worked lamps Total Standby Power = Psb+ Pnet= 0.5 + 0.5= 1W as the limit?

<table>
<tr><td colspan="2"></td><td></td><td>- If this is not the case, strongly suggest the Pnet standby power should be 1W as the limit.</td></tr>
<tr><td colspan="2">1.2. Separate control gear

The minimum energy efficiency requirements given in Table 3 shall apply for separate control gear operating at full-load:</td><td>We propose to adapt the text to include the following remarks.
• No-load: limit this requirement on products where no load operation is within the intended use.
• “No-load as intended use” is already mentioned in the comments about the definition of no-load mode, shouldn’t be repeated again.</td><td>- Table values
No-load: not every control gear is designed to operate without load
Comment: “No-load as intended use” is already mentioned in the comments about the definition of no-load mode, shouldn’t be repeated again.</td></tr>
<tr><td colspan="2">Table 3: Minimum efficiency for separate control gear at full-load</td><td></td><td></td></tr>
<tr><td colspan="2"><table>
<tr><th>Declared output power of the control gear (P_{cg}) or declared power of the light source (P_{ls}) in W, as applicable</th><th>Minimum efficiency</th></tr>
<tr><td><u>Control gear for HL light sources</u>
all wattages P_{cg}</td><td>0,91</td></tr>
<tr><td><u>Control gear for FL light sources</u>
$P_{ls} \leq 5$
$5 < P_{ls} \leq 100$
$100 < P_{ls}$</td><td>0,71
$P_{ls}/(2*\sqrt{(P_{ls}/36)+38/36*P_{ls}+1})$
0,91</td></tr>
<tr><td><u>Control gear for HID light sources</u>
$P_{ls} \leq 30$
$30 < P_{ls} \leq 75$
$75 < P_{ls} \leq 105$</td><td>
0,78
0,85
0,87</td></tr>
</table></td><td>Add a note:
“P_{ls} is the nominal power of the light source”</td><td>To align with Reg 245/2009. Rated power differs in some cases from the nominal power.</td></tr>
</table>

$105 < P_{ls} \leq 405$ 0,90 $405 < P_{ls}$ 0,92			
Control gear for LED or OLED light sources $P_{cg} \leq 10$ 0,70 $10 < P_{cg} \leq 25$ 0,75 $25 < P_{cg} \leq 50$ 0,83 $50 < P_{cg} \leq 100$ 0,86 $100 < P_{cg} \leq 300$ 0,88 $300 < P_{cg}$ 0,90		***Implement the proposed formula instead of stepwise definitions:*** $\mathbf{P_{cg} \leq P^{0,81} / (1,09 * P^{0,81} + 2.1)}$	- The stepwise defined requirements for efficiency can lead to disadvantages for customers due to false or palliated power declarations. - "Natural" efficiency dependency of control gear from power level is continuous (see also attachment at the end of this document). - The limit 0.70 is too strict for very low power applications.
Multi-wattage separate control gears shall comply with the requirements in Table 3 according to the maximum declared power on which they can operate. The no-load power of a separate control gear P_{no} shall not exceed 0.5 *W.* The standby power of a separate control gear P_{sb} shall not exceed 0.5 W.		Multi-wattage separate control gears **for FL and HID light sources** shall comply with the requirements in Table 3 according to ~~maximum~~ **the each** declared power on which they can operate. The no-load power of a separate control gear **intended to be operated in no-load mode** P_{no} shall not exceed 0.5 ***W* if no-load mode is explicitly included by the manufacturer or importer in section 3.2.2.d** The **network** standby power of a separate control gear $\mathbf{P_{net}}$ shall not exceed 0.5 W.	- Amendment is proposed to align multiwattage requirements with 245/2009. - No-load requirement shall only apply to control gear intended for no-load operation. Majority of the control gears is not intended for no-load operation and should not be required to comply with this requirement. **-** Many control gears are not designed to operate in 'no-load mode'.
2. FUNCTIONAL REQUIREMENTS **2.1. Light sources** The functional requirements specified in Table 4 shall apply for light sources. **Table 4: Functional requirements for light sources**		***We propose to adapt the text with the following:*** • ***Keep power factor limitations for non-LED sources.Eliminate endurance testing, but keep the early failures test.*** • ***Delete the reference to flicker (to be considered at a later stage).***	- It is necessary to gain experience about the use of the just published test method for flicker (IEC TR 61547-1 – October 2017); the same also for the coming IEC Technical Report "Objective test method for stroboscopic effects of lighting equipment" (IEC TR 63158 – forecast publication: 2018 – 08) - Endurance tests mean a lot of work for manufacturers (and MSA).

<table><tr><td>Colour rendering</td><td>CRI ≥ 80 Ra (except for HID with Φ_{use} > 4 klm and for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a CRI<80, when a clear indication to this effect is shown on the light source packaging and in all relevant printed and electronic documentation)</td></tr><tr><td>Displacement factor (DF, cos ϕ_1) at power input P for LED and OLED MLS</td><td>No limit at P ≤ 2W, DF ≥ 0.4 at 2W < P ≤ 5W, DF ≥ 0.7 at 5W < P ≤ 25W DF ≥ 0.9 at 25W < P</td></tr><tr><td>Functionality after accelerated endurance testing for LED and OLED</td><td>as specified in Annex V</td></tr><tr><td>Colour consistency for LED and OLED light sources</td><td>Variation of chromaticity coordinates within a six-step MacAdam ellipse or less.</td></tr><tr><td>Flicker for LED and OLED MLS</td><td>Pst LM ≤ 1.0 at full-load</td></tr></table>		- This is not going in the direction of simplification. - By grouping of products to product families, a lot of meaningless endurance testing of products with similar characteristics can be avoided. - These requirements are sensible for light sources on MLS (e.g. retrofit products). But Test of functional requirements (e.g. endurance, displacement factor or flicker) of light sources removed from its containing products and without the intended control gear make no sense.
2.2. Separate control gears			

There are no functional requirements for separate control gears.		
3. INFORMATION REQUIREMENTS FOR MANUFACTURERS AND IMPORTERS **3.1. Information to be displayed on the light source itself** For all light sources, except CTLS, LFL, CFLni, other FL, and HID, the value and physical unit of the useful luminous flux (lm) and colour temperature (K) shall be displayed in a legible font on the surface if, after the inclusion of safety-related information, there is sufficient space available for it without unduly obstructing the light emission. For directional light sources the beam angle (˚) shall also be indicated. If there is room for only two values, the useful luminous flux and the colour temperature shall be provided. If there is room for only one value, the useful luminous flux shall be provided.	**Add HL as well** For all light sources, except CTLS, LFL, CFLni, other FL, and HID, the value and physical unit of the useful luminous flux (lm) and colour temperature (K) **and the beam angle of directional light sources if relevant** shall be displayed in a legible font on the surface if, after the inclusion of safety-related information, there is sufficient space available for it without unduly obstructing the light emission.	- Small directional light sources may not provide sufficient space to indicate the beam angle. The beam angle should not be required separately, but in the context of flux and CCT - General question concerning all values: are these nominal, rated or measured values? – no info found. Also in following chapters.
3.2. Information to be visibly displayed on the packaging 3.2.1. Light sources Light sources in scope of this Regulation are in scope of Commission Delegated Regulation (EU) …/… supplementing Regulation (EU) 2017/1369 with regard to energy labelling for light sources. As concerns the information to be visibly displayed on the packaging of light sources, manufacturers and importers shall apply the requirements set out in Annex V of	**Light sources, except LFL, CFLni, other FL, and HID,** in scope of this Regulation are in scope of Commission Delegated Regulation (EU) …/… supplementing Regulation (EU) 2017/1369 with regard to energy labelling for light sources. As concerns the information to be visibly displayed on the single packaging wrapping the light sources, manufacturers and importers shall apply the requirements set out in Annex V of Commission Delegated Regulation (EU) …/… .	- The whole 3.2 should be applied for components that are marketed to end user, and not for components sold through B2B (as in this situation such information would be useless). For example, only “independent control gears” could be sold to the end users, and not built-in ones (as they should be used by “skilled persons”). - For the traditional products, the packaging information requirement shall be kept on the same level as it is today.

Commission Delegated Regulation (EU) …/… .		
3.2.2. Separate control gears If a separate control gear is placed on the market in a packaging containing information to be visibly displayed to users, prior to their purchase, the following information shall also be clearly and prominently displayed on the packaging:	If a separate control gear is placed on the market in a packaging containing information to be visibly displayed **to end-**users, prior to their purchase, the following information shall also be clearly and prominently displayed on the single packaging:	- It needs to be made clear if this clause is applicable to all separate control gears or only gear that is for sale direct to the end user. - It is not clear who is the "user"; final user or professional one? - Is this requirements for independent control gear? To be clarified. - there are still doubts in the interpretation of this sentence
a) the maximum output power of the control gear (for HL, LED and OLED) or the power of the light source for which the control gear is intended (for FL and HID);		
b) the type of light source(s) for which it is intended;		
c) the efficiency in full-load, expressed in percentage;	***We propose to delete this requirement. Alternatively we propose to continue to use the same energy efficiency markings as given in 245/2009 for FL controlgear (A1 BAT, A2 BAT, A2) and for HID controlgear A2*.**	Reason: The minimum efficiency is given in table 3 and it should be sufficient. The actual efficiency is dependent on the light source. As the control gear is typically designed to operate several light sources, it becomes two complicated and expensive to give all the values. Besides the measurement uncertainty is high and small differences are not possible to verify reliably. This may lead to unfair competition on the declared efficiency values. Anyway, very high test cost are involved and that is not justified.
d) the no-load power (Pno), expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging but shall anyway be declared in the technical documentation and on websites;	Add to existing point (d): d) … **This requirement only holds for control gear designed to be operated in no load conditions. If this is the intended operation mode, this should be clearly indicated in the technical file**.	This requirement shall apply only if the control gear is intended for no-load use. If the information is missing the control gear is not intended for the no-load use.
e) the standby power (Psb), expressed in W and rounded to the second decimal. If	e) the **network** standby power (**P_{net}**), expressed in W and rounded to the second decimal. If the	

the value is zero, it may be omitted from the packaging but shall anyway be declared in the technical documentation and on websites;	value is zero, it may be omitted from the packaging but shall anyway be declared in the technical documentation and on websites;	
f) a warning if the control gear is not suitable for dimming of light sources, or can be used only with specific types of dimmable light sources or using specific wired or wireless dimming methods. In the latter cases, detailed information on the conditions in which the control gear can be used for dimming shall be provided on the manufacturer's or importer's website;		
g) a QR-code redirecting to a website optimized for mobile devices, or the internet address for a website, where full information on the control gear can be found.		
The information does not need to use the exact wording on the list above. In addition, it may be displayed in the form of graphs, drawings or symbols.		
3.3. Information to be visibly displayed on a free-access website 3.3.1. Light sources Light sources in scope of this Regulation are in scope of Commission Delegated Regulation (EU) …/… supplementing Regulation (EU) 2017/1369 with regard to energy labelling for light sources. As concerns the information to be visibly displayed on a free-access website, manufacturers and importers shall apply the requirements set out in Annex V of Commission Delegated Regulation (EU) …/… in relation to the product database set out in Article 4 of Regulation (EU) 2017/1369.		

Manufacturers and importers are not refrained from setting other free-access websites.		
3.3.2. Separate control gears If a separate control gear is placed on the market, the following information shall be displayed on at least one free-access website, including a website optimized for mobile devices linked to a QR-code on the packaging:	If a separate control gear is placed on the **market and available for the end-user**, the following information shall be displayed on at least one free-access website, including a website optimized for mobile devices linked to a QR-code on the packaging:	It needs to be made clear if this clause is applicable to all separate control gears or only gear that is for sale direct to the end user, especially as this requirement is linked to item 3.2.2 and the use of a QR code is specified. - It is not clear who is the “user”; final user or professional one? - Is this requirements for independent control gear? To be clarified.
a) the information specified in point 3.2.2;		
b) the outer dimensions in mm;		
c) the mass in grams of the control gear, without packaging, and without lighting control parts and non-lighting parts, if any and if they can be physically separated from the control gear;		
d) instructions how to remove lighting control parts and non-lighting parts, if any, or how to switch them off or minimize their power consumption during control gear testing;		
e) if it can be used with dimmable light sources, a list of minimum characteristics that the light sources should have to be fully compatible with the control gear during dimming, and possibly a list of compatible dimmable light sources;		
f) recommendations on how to dispose of it at the end of its life for recycling in line with Directive 2012/19/EU ([31]).		
The information does not need to use the exact wording on the list above. In addition, it may be displayed in the form of graphs, drawings or symbols.		

[31] OJ L 197, 24.7.2012, p. 38.

Information on separate control gears that are no longer in production or that are not or no longer intended for sale in the European Union should be clearly marked as such and/or moved to a separate section of the website.		
The same information shall also be contained in the technical documentation file drawn up for the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC.		
3.4. Technical documentation Light sources in scope of this Regulation are in scope of Commission Delegated Regulation (EU) …/… supplementing Regulation (EU) 2017/1369 with regard to energy labelling for light sources. The technical documentation file drawn up for the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC shall contain the information set out in Annex V of Commission Delegated Regulation (EU) …/… in relation to the compliance part of the product database set out in Article 4 of Regulation (EU) 2017/1369 and the technical documentation pursuant to Article 3.3 of Regulation (EU) 2017/1369. The two technical documentations, for ecodesign and for energy labelling, can be combined in a single document.		The Technical Documentation should be also related to other Directives (like LVD, EMC, ….) that's why it is necessary to align the different definitions to avoid misunderstandings and problems with MS Authorities.
3.5. Information for products specified in Annex I point 3 For the light sources and separate control gears specified in Annex I point 3, the intended purpose shall be stated on all forms of packaging, product information and advertisement, together with a clear indication		

that the light source is not intended for use in other applications. The technical documentation file drawn up for the purposes of conformity assessment in accordance with Article 8 of Directive 2009/125/EC shall list the technical parameters that make the product design specific to qualify for the exemption.		
ANNEX IV – VERIFICATION PROCEDURES FOR MARKET SURVEILLANCE AUTHORITIES When verifying the compliance of a product model with the requirements laid down in this Regulation pursuant to Article 3(2) of Directive 2009/125/EC, for the requirements referred to in this Annex, the market surveillance authorities of the Member States shall apply the following procedure:		The indicated tolerances are still low and need to be reconsidered. In order to incorporate the measurement variances among various test laboratories, a 10% tolerance should be considered regardless of the sample size.
(1) The Member State authorities shall verify a single unit of the model.		clarify wording **"verify a single unit of the model"**
(2) The Member State authorities shall assess whether:		
(a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values), and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer or importer than the results of the corresponding measurements carried out pursuant to paragraph (g) thereof; and	(a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values), and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer or importer than the results of the corresponding measurements **of the manufacturer** or importer carried out pursuant to paragraph (g) thereof; and	
(b) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer or importer does		

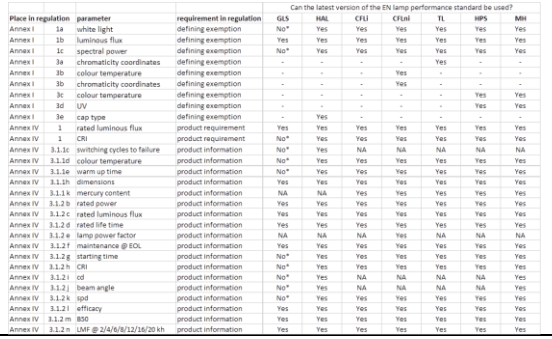
not contain values that are more favourable for the manufacturer or importer than the declared values.		
(3) If the results referred to in point 2(a) or (b) are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.		
(4) If the results referred to in point 2(a) and (b) are achieved, the Member States authorities shall test 10 units of the model. For light sources, if the acquisition costs for the 10 units would exceed 500 euros, Member State authorities may reduce the sample size to 3 units.		
(5) The model and all equivalent models shall be considered to comply with the applicable requirements if the determined values of the applicable parameters comply with the respective verification tolerances as given in Table 6, and the functionality after accelerated endurance testing meets the requirements of Annex V, if applicable. The determined values are assessed as follows:		
(a) for each unit measure the applicable parameters from Table 6;		
(b) calculate the determined value of each applicable parameter as the arithmetical mean of the measured values of the 10 units for that parameter.		
(6) If the results referred to in point 5 are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.		
(7) The Member State authorities shall provide all relevant information to the authorities of the other Member States		

and to the Commission without delay after a decision being taken on the non-compliance of the model according to points 3 and 6.		
Member State authorities shall use reliable, accurate and reproducible measurement procedures, which take into account the generally recognised state-of-the-art measurement methods, including methods set out in documents whose reference numbers have been published for that purpose in the *Official Journal of the European Union.*		
The Member State authorities shall only apply the verification tolerances that are set out in Table 6 and shall only use the procedure described in points 1 to 7 for the requirements referred to in this Annex. No other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.	The Member State authorities shall only apply the verification tolerances that are set out in Table 6 and shall only use the procedure described in points 1 to 7 for the requirements referred to in this Annex. ~~No other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.~~ **Products shall be regarded non-compliant if measurement results at MSA are outside verification tolerance + MSA's measurement uncertainty (within "non conformance-zone").**	Tolerances of product characteristics are resulting e.g. from component deviations and manufacturing tolerances. During product verification testing additional measurement uncertainties have to be considered. Measurement uncertainties at MSA shall be assessed acc. to relevant standards (e.g. ISO 14253-1) and documented in test reports. Products shall be regarded non-compliant if measurement results at MSA are outside verification tolerance + MSA's measurement uncertainty (within "non-conformance-zone").
In case light sources and/or control gears are placed on the market as parts inside a containing product or supplied with the product, the manufacturer or importer of this containing product shall facilitate market surveillance authorities verifying compliance of the light sources and/or control gears with this Regulation by providing, on request, the identification of the contained light source(s) and control gear(s), and detailed instructions to the market surveillance authorities on how to dismount light source(s) and/or control gear(s) for inspection without permanent mechanical damage.		See comments on Art. 4 SLR concerning 'without permanent mechanical damage.'

If the containing product contains multiple identical light sources connected to one control gear, possibly each individually emitting less than 60 lm but in total emitting more than 60 lm, verification testing of the market surveillance authorities may be limited to a representative subset of the individual light sources and the results can be extrapolated.		- Something that emits less than 60lm is not a light source according to definition. What about products containing multiple light sources of less than 60 lm? - A solution could be the inclusion in the scope of light sources that emit less than 60 lm and to move them to the list of exemptions, so that they can still be regulated.
The verification tolerances defined in this Annex relate only to the verification of the declared parameters by Member State authorities and shall not be used by the manufacturer as an allowed tolerance to establish the values in the technical documentation or in interpreting these values with a view to achieving compliance or to communicate better performance by any means.		
Table 6: Verification tolerances		- The list of parameters to be considered is long; is this the intention of the proposal to simplify Ecodesign requirements? - Flicker should not be considered, and lifetime should be left to Company declarations. - At the present there is no a unique method to declare the light source lifetime, so it would be better to leave this declaration to manufacturers or importer until a consolidated method is available. - Tolerances are narrow in the regulations for flux (5%), intensity (5%), angle (5%). - Tolerances on performance standards are for flux (10%), intensity (25%), angle (25%)… Narrow tolerances means increasing costs without a very big benefit for the costumer (especially on angle and intensity). - Tolerance on CRI and intensity should be asymmetric. Declared values shall refer to design target values of manufactures. (it is not beneficial for costumers if

		product values deviate too much from declared values – even in “allowed” direction (e.g. higher useful luminous flux) which can lead to undesired inhomogeneous lighting scenes). - Measurement uncertainties of the labs of the market surveillance authorities are not defined The reference standards are missing in the regulation (how it will be measured – operating conditions (cooling), without list of references to the harmonized standards it is impossible to assess the limits correctly. - Only use standardised parameters and state-of-the-art measurement procedures **Error! Reference source not found.** 2 gives the location of relevant parameters in the regulation and the applicability of the standards given in **Error! Reference source not found.**. Only the standard for incandescent lamps does not contain a description of all relevant measurement methods, as indicated in the table by “No*****”. For these parameters, the standard for halogen lamps should be used. Proposal: Add lists for the products in the scope of this (part of the) regulation and their related performance standards. *Table 1: Lamps in the scope* Add to table above: LED Lamps > 50V LEDi EN 62612:2013 + Amendment 1: 2017 LED Modules ?? EN 62717:2017

Lamps in the scope of article 1	abbreviation	standard	date	& amendments to	updating in Cenelec?
Incandescent lamps	GLS	EN 60064	1995	2009	no
Halogen lamps	HAL	EN 60357	2003	2016	no
Fluorescent lamps with integrated ballast	CFLi	EN 60969	1993	2000	yes
Fluorescent lamps without integrated ballast	CFLni	EN 60901	1996	2012	yes
Fluorescent lamps without integrated ballast	TL	EN 60081	1998	2013	yes
High Pressure Sodium lamps	HPS	EN 60662	2012		yes
Metal Halide lamps	MH	EN 61167	2016		yes

		Table 2 Location of relevant parameters in the regulation and the applicability of the standards 
Parameter / **Full-load on-mode power P_{on} [*W*]:** — **Sample size** — **Verification tolerances**	***Instead of 'determined value' use* 'determined arithmetical mean of the measured values' *throughout the table***	- Tolerances smaller than a quality measurement lab can deliver - (5%, 2.5% etc.)
P_{on} ≤ 5*W* — 3 — The determined value shall not exceed the declared value by more than 10 %. P_{on} ≤ 5*W* — 10 — The determined value shall not exceed the declared value by more than 10 %.	***Keep the 10% for all powers >5W and for all sample sizes.*** ***Use an absolute 0.5W tolerance for P_{on} ≤ 5W***	- Use 0.5W tolerance below P_{on} = 5W - Critical to low power lamps. Eg ,2w Take the 0.2W tolerances. -Put the requirement for below 5W, use 0.5W for all as the tolerances. - P_{on} < 5W %5
5*W*< P_{on} <100*W* — 3 — The determined value shall not exceed the declared value by more than 10 %. 5*W*< P_{on} <100*W* — 10 — The determined value shall not	***Instead of 'determined value' use* 'determined arithmetical mean of the measured values'**	

Place in regulation		parameter	requirement in regulation	Can the latest version of the EN lamp performance standard be used?						
				GLS	HAL	CFLI	CFLni	TL	HPS	MH
Annex I	1a	white light	defining exemption	No*	Yes	Yes	Yes	Yes	Yes	Yes
Annex I	1b	luminous flux	defining exemption	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex I	1c	spectral power	defining exemption	No*	Yes	Yes	Yes	Yes	Yes	Yes
Annex I	3a	chromaticity coordinates	defining exemption	-	-	-	-	Yes	-	-
Annex I	3b	colour temperature	defining exemption	-	-	-	Yes	-	-	-
Annex I	3b	chromaticity coordinates	defining exemption	-	-	-	Yes	-	-	-
Annex I	3c	colour temperature	defining exemption	-	-	-	-	-	Yes	Yes
Annex I	3d	UV	defining exemption	-	-	-	-	-	Yes	Yes
Annex I	3e	cap type	defining exemption	-	Yes	-	-	-	-	-
Annex IV	1	rated luminous flux	product requirement	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	1	CRI	product requirement	No*	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.1c	switching cycles to failure	product information	No*	Yes	NA	NA	NA	NA	NA
Annex IV	3.1.1d	colour temperature	product information	No*	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.1e	warm up time	product information	No*	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.1h	dimensions	product information	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.1 k	mercury content	product information	NA	NA	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 b	rated power	product information	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 c	rated luminous flux	product information	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 d	rated life time	product information	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 e	lamp power factor	product information	NA	NA	NA	Yes	NA	NA	NA
Annex IV	3.1.2 f	maintenance @ EOL	product information	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 g	starting time	product information	No*	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 h	CRI	product information	No*	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 i	cd	product information	No*	Yes	NA	NA	NA	NA	Yes
Annex IV	3.1.2 j	beam angle	product information	No*	Yes	NA	NA	NA	NA	Yes
Annex IV	3.1.2 k	spd	product information	No*	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 l	efficacy	product information	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 m	B50	product information	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex IV	3.1.2 n	LMF @ 2/4/6/8/12/16/20 kh	product information	Yes	Yes	Yes	Yes	Yes	Yes	Yes

		exceed the declared value by more than 5 %.		
P_{on} ≥100*W*	3	The determined value shall not exceed the declared value by more than 5 %.	*Instead of 'determined value' use* **'determined arithmetical mean of the measured values'** ***Suggest to keep the same limit and use 5%.***	
	10	The determined value shall not exceed the declared value by more than 2,5 %.		
Power factor [*0-1*]	3	The determined value shall not be less than the declared value minus 10 %.	***Use displacement factor* (DF cos (φ1))**	In the regulation the displacement factor is used
	10	The determined value shall not be less than the declared value minus 5 %.		
Useful luminous flux Φ_{use} [*lm*]	3	The determined value shall not be less than the declared value minus 10 %.	***Keep the 10% for all sample sizes.***	5% is too small as measurement equipment has typical tolerances of 3 % for luminous flux. Use 10% for 10 lamps. Luminous flux measurements have an intrinsic uncertainty of 10% coming from testing equipment, test procedure and lamp-to-lamp variations. Decreasing sample number from 20 (as required by 245/2009) to 10 could lead to an additional uncertainty of test values, so tolerances should not be further decreased
	10	The determined value shall not be less than the declared value minus 5 %.		
No-load power P_{no}, Standby	3	The determined value shall not exceed the		

power P_{sb} and Networked standby power P_{net} [*W*]		declared value by more than 0,10 W.		
	10	The determined value shall not exceed the declared value by more than 0,10 W.		
CRI [*0-100*]	3	The determined value shall not deviate from the declared value by more than 3.	***At both sample sizes use the following sentence***: '**The determined arithmetical mean of the measured values shall not be lower than the declared value by more than 3.'**	- Since variation is relatively low, we suggest keeping the deviation value given by the EN60081 Section 1.5.6 (c) standard for individual CRI value which is 3, regardless of the sample size. **-** Tolerance on CRI and Intensity should be asymmetric. - all "plus" tolerances must be allowed
	10	The determined value shall not deviate from the declared value by more than 2.		
Flicker [*Pst LM*]	3	The determined value shall not exceed the declared value by more than 10 %.	**Delete this line**	Following the previous points, requirements for flicker should be removed
	10	The determined value shall not exceed the declared value by more than 5 %.		
Colour Consistency [*MacAdam ellips steps*]	3	The determined number of steps shall not exceed the declared number of steps.		
	10	The determined number of steps shall not exceed the declared number of steps.		
Control gear				- Tolerances are too tight

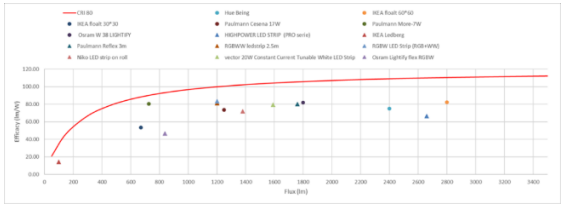
efficiency [%]				
P_{out} ≤ 5*W*	10	The determined value shall not be less than 90% of the declared value.	**Change from Pout to Pcg (as referred to in table 3)**	- Pout is not defined and not used in regulation
5*W*< P_{out} <100*W*	10	The determined value shall not be less than 95% of the declared value.		
P_{out} ≥100*W*	10	The determined value shall not be less than 97,5% of the declared value.		
Luminous intensity [*cd*]	3	The determined value shall not deviate from the declared value by more than 10 %.	**Change sentence on Intensity from "The determined value shall not deviate from the declared value by more than 5 %." to "The determined value shall not be less than the declared value minus 25%".**	- Increase tolerances for angle and Intensity to 25%.
	10	The determined value shall not deviate from the declared value by more than 5 %.		
Beam angle (*degrees*)	3	The determined value shall not deviate from the declared value by more than 10 %.	**Change sentence on Angle from "The determined value shall not deviate from the declared value by more than 5 %." to "The determined value shall not deviate from the declared value by more than 25 %".**	- The tolerances are too small. And no difference for the used to have a different beam angle. - Suggest follow Energy star requirement as below. or use 25% as the limit
	10	The determined value shall not deviate from the declared value by more than 5 %.		

					4.3 **Beam angle tolerance of PAR and R lamps** Beam angles used in designations are nominal values. However, beam angles of PAR and MR lamps, made from pressed glass lenses and reflectors, vary considerably over time from mold wear. Similarly, blown glass R, BR, ER, and BRL lamps have a wide variation due to changes in frost density and light center length. The following are normally expected tolerances from the nominal value. **Beam Angle Tolerance** **PAR and MR Lamps**: Beam Angle / Tolerance: 1° to 12° / +/- 3°; 15° / +/- 4°; 20° to 40° / +/- 6°; 45° & higher / +/- 10° **R Lamps**: Beam Angle / Tolerance: All / +/- 12°
Lumen Maintenance Factor (for FL and HID)	3	The determined value shall not be less than 90% of the declared value.		**Keep 90% regardless of sample size.**	Keep 90% regardless of sample size, as reducing the number of samples from 20 to 10 will not result lower deviation. In addition, these are matured products, there won't be any investment done in any further manufacturing process improvement.
	10	The determined value shall not be less than 95% of the declared value.			
Survival Factor (for FL and HID)	3	The determined value shall not be less than 0.65 (1 of 3 allowed to fail)		**Maintain tolerance levels from 245/2009**	- This regulation's goal is to simplify the verification procedure. It doesn't seem to be a viable solution to test matured product types for full life time (ie: 20000hrs). The Definition of tolerance in table 6 is also not clear. What is 0,65? **-** In reality the number of surviving lamps during life time is decreasing, survival factor is changing. We do not understand the 0,65 value.
	10	The determined value shall not be less than 0.90 (1 of 10 allowed to fail).			
$M_{70}F_{50}$ lifetime (for LED and OLED)	3	The determined value shall not be less than the declared value minus 20%		***Change to L70***	
	10	The determined value shall not be less than the declared value minus 10%			

ANNEX V - FUNCTIONALITY AFTER ACCELERATED ENDURANCE TESTING **1. LED AND OLED LIGHT SOURCES** Models of LED- and OLED- light sources shall undergo accelerated endurance testing to verify their lumen maintenance and survival factor. This accelerated endurance testing shall consist of three single tests as specified below. Member States authorities shall test 10 units of the model for each test. If the acquisition costs for 10 units would exceed 500 euros, Member State authorities have the option to reduce the sample size to 3 units for each test.		
(1) A temperature cycling test as specified in relevant standards. Where no standard is available, the duration of this test shall be 1000h. The temperature is varied from -10°C to +40°C over 4h periods. A 4h period consists of 1h holding time at each end temperature and 1h transfer time with a rate of temperature change of 1°C/min until the end temperature is reached. During the test the model is switched on for 17min and off for 17min. At the end of the test, all 3 models (if sample size used is 3) or 9 of 10 models (if sample size used is 10) shall operate and have a luminous flux that is not less than 70% of the initial luminous flux for a period of at least 15 min, and show no physical effects of temperature cycling such as cracks or delamination.	Delete this test requirement.	Temperature testing: - As indicated in the IEC 62612 (small deviation: power switching is 34'on/34'off, chosen to get a phase shift between temperature and switching period, in SLR 17'/17'), this test is to check the mechanical strength of the assembly. That is why reference is made to delamination and cracks. Studies have been done and have shown that under these moderate conditions with 250 cycles no cracks and delamination will be observed. - In general the industry uses specially designed acceleration tests and simulations to prove compliance. This procedure is confidential in the companies. - Suggest removing this test item. 1) based on the Energy star experience, the switch cycling is not critical to LED. So, it is not worth to do that. 2) besides, the temperature cycling testing cost higher for factory. it needs special chamber, normally, 10 euro/hours x1000= 10000 euro. It brings too much pressure for factory to do test: The assessed manufacturer costs are in Millions per

		year. which would result in increased product cost price for consumers.
(2) A supply switching test as specified in relevant standards. Where no standard is available, at test voltage, current or power, the model shall be switched on and off for 30 seconds each. The number of switching cycles shall be equal to half the model's declared lifetime with a maximum of 1000h. At the end of the test, all 3 models (if sample size used is 3) or 9 of 10 models (if sample size used is 10) shall operate and have a luminous flux that is not less than 70% of the initial luminous flux for a period of at least 15 min.	(2) A supply switching test as specified in relevant standards. Where no standard is available, at test voltage, current or power, the model shall be switched on and off for 30 seconds each. The number of switching cycles **shall be repeated for a number** equal to half the rated life in hours **or the claimed switching cycle, whichever figure is higher, with a maximum of 1,000 hours.** At the end of the test, all 3 models (if sample size used is 3) or 9 of 10 models (if sample size used is 10) shall operate ~~and have a luminous flux that is not less than 70% of the initial luminous flux~~ **for a period of at least 15 min.**	- Fasts switching test: no relevance for LED performance. Device operates on an an average, lower temperature. - Purpose of this test is to check the endurance of the built-in electronic components Skip last sentence: The number of switching cycles shall be equal to half the model's declared lifetime with a maximum of 1000h. Number of cycles: The cycling shall be repeated for a number equal to half the rated life in hours (example: 10 k cycles if rated life is 20 000 h.) with a maximum of 10k cycles. In many cases we do claim higher switch cycle than the minimum according to the standard Delete 'and have a luminous flux that is not less than 70% of the initial luminous flux'.
(3) An accelerated operation life test as specified in relevant standards. Where no standard is available, the duration of this test shall be *1000h*. The model shall be operated continuously without switching at a temperature corresponding to 10°C above the maximum specified operating temperature if declared by the manufacturer. If there is no declared value or the value is below 40°C, then the test shall be performed at 50°C. Any thermal protecting devices that would switch off the model or reduce its performance shall be bypassed.	***LightingEurope proposes to maintain the 500 hrs early survival test and to eliminate the accelerated lifetime test.*** **[insert 500 h proposal from VHK's proposal]**	- Accelerated life test: Is different for LED modules, LED lamps and LED luminiares. For the last two this is a problem, they cannot be operated on a temp +10 degrees above the maximum specified temp by manufacturer. There is not a lot of evidence for performance in this area. - Testing in a climate chamber at elevated, well controlled temperatures is very expensive for the surveillance authorities. - 50C ,Testing with the thermal protection disabled is not reasonable. The failure does not occur in real application with a working NTC protection. - This test is to check for catastrophic failures. It is also mentioned that 'An accelerated test should not evoke fault modes or failure mechanisms which are not related to normal life effects. For example, a too high temperature increase would lead to chemical or

		physical effects from which no conclusions on real life can be made. In general we propose to maintain the 500 hrs early survival test. With these proposals the good will suffer from the bad..
At the end of this test, and after cooling down to room temperature and being stabilized, all 3 models (if sample size used is 3) or 9 of 10 models (if sample size used is 10) shall operate and have a luminous flux that is not less than 80% of the initial luminous flux for a period of at least 15 min.	At the end of the test, ~~and after cooling down to room temperature and being stabilized~~ all 3 models (if sample size used is 3) or 9 of 10 models (if sample size used is 10) shall ~~operate and have a luminous flux that is not less than 80% of the initial luminous flux~~ **operate for a period of at least 15 min.**	Exclude the lm maintenance criteria from here as well. There is no transfer function that can be determined between the lm maintenance at operating temperature and at higher temperature. The 1000 hrs is very short to evaluate lm maintenance (at 1000 hrs the lm maintenance may be even more than 100%).
2. SEPARATE CONTROL GEARS FOR LED AND OLED LIGHT SOURCES Models of separate control gear for LED- and OLED- light sources shall undergo accelerated endurance testing according to relevant standards to test their survival factor. Member States authorities shall test 10 units of the model for each test. At the end of each test, 9 of 10 models shall operate normally for a period of at least 15 min.	**Propose 500 h early failure test**	- There is no relevant standard for "accelerated" endurance testing for LED control gear. - *refer to* IEC 62384
ANNEX VI – BENCHMARKS The best available technology on the market, at the time of entry into force of this Regulation, for the environmental aspects that were considered significant and are quantifiable, is indicated below. Features required in certain applications, e.g. a high colour rendering, might prevent products offering those features from achieving these benchmarks.		

Energy efficiency The most efficient light sources have an energy efficiency (based on useful luminous flux) of: – Non-directional light sources: 120-140 lm/W – Mains voltage directional light sources: 90-100 lm/W – Extra low voltage directional light sources: 85-95 lm/W – Linear light sources (tubes): 140-160 lm/W The most efficient separate control gears have an energy efficiency of 95%.	The most efficient light sources have an energy efficiency (based on useful luminous flux) of: – Non-directional light sources: 120-140 lm/W – Mains voltage directional light sources: 90-100 lm/W – Extra low voltage directional light sources: 85-95 lm/W – Linear light sources (tubes): 140-160 lm/W **CTLS: 60 – 80 lm/W**	Products Benchmark list:  See below (1)*
Mercury content The most efficient light sources and separate control gears do not have any mercury content.		

(1)

Name	Power	Flux	Efficacy	Link
HIGHPOWER LED STRIP (PRO serie)	40	2660	66.5	https://www.amazon.de/HIGHPOWER-STREIFEN-warmwei%C3%9F-PRO-Serie-2660Lumen/dp/B00HR2UR1Q/ref=sr_1_1?ie=UTF8&qid=1511194303&sr=8-1&keywords=led+light+strip+24V
IKEA Ledberg	7	100	14.3	http://www.ikea.com/nl/nl/catalog/products/70359694/
Paulmann Reflex 3m	22	1760	80.0	https://be.paulmann.com/nl/armaturen/smart-home/zigbee/smarthome-zigbee-led-stripe-set-reflex-3-m-tunable-white-gecoat/50080?sPartner=bdi&utm_source=BDI&utm_medium=GoogleShopping&utm_content=Shopping&utm_campaign=Mainflight2017&gclid=EAIaIQobChMIrMOvvt_N1wIVCRIbCh3PpQiHEAYYAiABEgLGKPD_BwE
RGBWW ledstrip 2.5m	14.4	1200	83.3	https://ledstrip-specialist.nl/5-meter-rgbww-led-strip-rgb-warm-and-koud-wit-losse-strip.html
LumiFlex Eco 700 LED Strip	48	3900	81.25	https://www.lumitronix.com/en_gb/lumiflex-eco-700-led-strip-warmwhite-3900lm-700-leds-5m-24v-56046.html
Philips Hue Lightstrip Plus	20	1600	80	https://www.philips.co.uk/c-p/7190155PH/hue-lightstrip-plus-eu-uk-base.hue-white-and-color-ambiance-lightstrip-plus
RGBW LED Strip (RGB+WW)	14.4	1200	83.3	https://www.amazon.co.uk/RGBW-LED-Strip-24V-14-4W-IP00-CRI80-SMD5050/dp/B00X1K06M8
Niko LED	19.2	1380	71.9	https://www.niko.eu/enus/products/light-and-light-control/accent-lighting/led-strip-on-roll-with-120-tunable-white-leds-m-60-warm-white-60-cold-white-leds-productmodel-niko-67bea48d-aa18-5ff7-8147-522f0e902402

strip on roll				
vector 20W Constant Current Tunable White LED Strip	20	1590	79.5	http://www.vectorlicht.com/product/20W-Constant-Current-Tunable-White-LED-Strip-2835-24V/
Osram Lightify flex RGBW	18	839	46.6	http://www.osram.nl/osram_bx/nl/producten/armaturen/indoor-armaturen/flexibele-led-modules/lightify-flex-rgbw/index.jsp
Philips Hue Being	32	2400	75	https://www.philips.co.uk/c-p/3261048P7/connected-luminaires-white-ambiance-being-ceiling-light
IKEA floalt 60*60	34	2800	82.35294	http://www.ikea.com/nl/nl/catalog/products/10302969/
IKEA floalt 30*30	12.5	670	53.6	http://www.ikea.com/nl/nl/catalog/products/40332210/
Paulmann Cesena 17W	17	1250	73.52941	https://nl.paulmann.com/armaturen/smart-home/zigbee/smarthome-zigbee-led-paneel-cesena-17-w-rgbw-chroom-mat/50087?fs=4217161989
Paulmann More-7W	9	725	80.55556	https://nl.paulmann.com/armaturen/smart-home/zigbee/smarthome-zigbee-led-inbouwpaneel-more-rond-7-w-tunable-white-wit/50071?fs=4217161989
Osram W 38 LIGHTIFY	22	1800	81.81818	https://www.amazon.de/Osram-Wandleuchte-intelligenter-Smartphonesteuerung-Kompatibel/dp/B00YSXB9SC/ref=sr_1_16?srs=10923286031&ie=UTF8&qid=1511204026&sr=8-16&keywords=led&th=1

ANNEX Z – Non-exhaustive list of Special Purpose Lamps (for exemption in Annex I)

Category	Application	Technical Features that might be used to discriminate the source as special purpose
Bodycare	Human Centric	White light with high CCT and blue content, therefore low efficacy, difficult to define but might be not white
	Photosensitive patients (Lupus)	White light with <?% of the SPD <450nm
	Sun tanning	White light with >80% of the SPD <400nm for low pressure discharge types, and with >40% of the SPD <400nm for high pressure discharge types
	Collagen anti-wrinkle	Probably Non-white light (depending on white light definition)
	Photodynamic Therapy	Probably Non-white light (depending on white light definition)
Medical	eczema treatment	Probably Non-white light (depending on white light definition)
	Psoriasis treatment	Effective between 300-320 nm maximum @ 311 nm. Probably Non-white light (depending on white light definition)
	Acne treatment	Probably Non-white light (depending on white light definition)
	Vitiligo treatment	Effective between 280-350 nm maximum @ 311 nm. Probably Non-white light (depending on white light definition)
	Atopic dermatitis	Effective between 300-400 nm . Probably Non-white light (depending on white light definition)
	Photopheresis	Effective between 250-400 nm maximum @ 340 nm. Probably Non-white light (depending on white light definition)
	Seasonal Affective disorder (SAD)	White light with >25% of the SPD <450nm
	Cutaneous T-cell lymphoma treatment	Exact specifications need to be checked
	Hyper bilirubine treatment	Effective between 400-500 nm maximum @ 460 nm. Probably Non-white light (depending on white light definition)
	Criggler-Najjar Syndrome	Effective between 400-500 nm maximum @ 460 nm. Probably Non-white light (depending on white light definition)
	Mycosis Fungoides	Effective between 300-390 nm maximum @ 350 nm. Probably Non-white light (depending on white light definition)

	Vitamin-D deficiency	Effective between 300-320 nm maximum @ 311 nm. Probably Non-white light (depending on white light definition)
	Photosensitive patients	Light sources provided specifically for use by photosensitive patients (e.g. frosted , pearl or opal incandescent lamps) (18) '' People with a specific disease causing photosensitive symptoms and people
Petcare / Plant growth / Killing	Horticultural	Light which may or may not be white and having photosynthetic efficacy > 1.2 µmol/J, and/or >25% of the SPD >700nm
	Horticultural	Lamps having specific photosynthesis, Chlorophyl synthesis, Phototropism, and Photomorphogenesis properties like given in DIN 5031
	Aquaria	Typically white light but modified spectra - may be possible to define some excluded chromaticity ranges within the white boundary?
	Coral	Possibly white light with >40% of SPD within 400-480nm for growth of zooxanthellae symbioses.
	Terraria	White light with >6% of SPD in region 320-400nm
	Fly trapping	Possibly white light with >20% of SPD <385nm
	Insect repelling	Possibly white light with <2% radiation <450nm
	Germicidal for destruction of DNA	Lamps having the peak radiation at 253.7nm
	Ozone	Lamps emitting radiation at 185.1nm for generation of ozone
	Disinfection	White light with >5% UVB and/or >20% UVA radiation
	Fish farming	Special spectra for different fish types (salt water sweet water)
	Birds not disturbed	Greenish blue light Non-white light
	Bats not disturbed	Red yellow light Non-white light
	Rice / Food Processing	Exact specifications need to be checked
Transport	Signals for road traffic	Incandescent lamps having a rated voltage ≥60V and failure rate <2% during first 1000h of operation (from 1428/2015)
	Signals for rail, marine, aircraft	Very difficult to define, many are like general lighting but different ratings (for instance constant current) or special caps
	Internal lighting of vehicles	Shockproof fluorescent lamps having special electrodes/ratings and/or single pin caps.
	Low temperature resistant lamps (<-30C)	Below the operation of many electronic circuits
INDUSTRIAL		

	Vision systems	High brightness source
	Lithographic Lighting (semiconductor production, LED, IC)	High brightness source
	Optical Sorting	High CRI >>90 High correlated color temperature
	Printing (directly)	UV/Vis
	Printing (etching the printing plates)	UV/Vis dedicated to the etching
	Color Comparison cabinets	Color comparison / artificial daylight (including special Purpose Type for ISO 3664 applications)
	Weathering chambers	UV/Vis
	UV Polymerization	UV
	UV curing	UV
	UV coating, decorating, stereolithography	UV
	Explosion protection	No sparking
	Food inspection	foods, grains, nuts, garments, color separation (special spectra currently used: specialty fluorescent lamps from 2100K, 3000K, ultra-blues, 600-650 nm, and blended phosphors with multiple peaks)
Heating	Infrared Ruby (space heating, animal husbandry, medical)	Probably Non-white light (depending on white light definition)
	Infrared Colourless types (cooking, curing, drying)	White light with CCT ≤2500K and power ≥100W
	3D Printing	Infra-red radiator/luminaire with customized geometry and bases and limited share of white light used for temperature transformation processes
	Rapid thermal processing	Temper faults in semiconductor wafers (IR sources)
	Polymer processing	stretch blow-moulding process in PET-Industry (IR sources)
Display	Food display	In the white region but white light but modified spectra - may be possible to define excluded chromaticity ranges within the white boundary?
	HID with colour temperature Tc>7000 K	White light with Tc > 7000 K ’
	Tunable colour	Products having capability to deliver a plurality of chromaticities
	Museum lighting	White light with <?x of the SPD <475nm, perhaps with a predefined ,low damage factor

	Colour comparison / artificial daylight	White light with CRI>95 and CCT>4500K and UV content >x% (TBD)
	Signs, Advertisement	Hand made "Neon" Sign lamps
Appliance	Oven	Incandescent lamps ≤25W and ≤60mm length which endure T=300°C operating temperature without degradation
	Cooker hood	Do not see any reason for continued exclusion : there are now satisfactory LED retrofits
	Refrigerator	Do not see any reason for continued exclusion : there are now satisfactory LED retrofits
	Sewing machine	Incandescent lamps ≤25W and ≤60mm length and ≤30mm diameter, resistent to mechanical shock & vibrations
	Hoover	Incandescent lamps ≤25W and ≤60mm length and ≤30mm diameter, resistent to mechanical shock & vibrations
	Freezer	Incandescent lamps ≤25W and ≤60mm length which endure Ta=-20°C ambient temperature without degradation, resistent to mechanical shock & vibrations
Science	Calibration lamps	Lamps for wavelength calibration (low pressure discharge) and light flux standards (halogen incandescent)
Photo-Optic	Image projection	White light with compact source : maybe possible to exclude by VHK Brightness criteria, need to check
	Image capture	Fluorescent lamps having CCT>5000K and not equipped with cap types G5 or G13
	Photo, Stage Studio Theatre & Video (Thermal)	White light with CCT ≥3000K and power ≥250W and life ≤1000h
	Photo, Stage Studio Theatre & Video (Thermal)	halogen technologies with CRI≥99 for studio, theater and film/movie application requiring special bases GX6.35, GY9.5, G9.5, G22, GY16, G38, 2PIN, PGJX50;

	Photo, Stage Studio Theatre & Video (Thermal)	halogen technologies with R7s bases, CRI≥99, total length >120mm and with lamp power ≥750W for professional customers e.g. for studio, theater and film/movie application
	Photo, Stage Studio Theatre & Video (Discharge)	White light with CCT ≥3200K and possibly brightness according to VHK criteria, need to check (Philips: Brightness exemption might need to tune the value: 1000-->500)
	Photo, Stage Studio Theatre & Video (Discharge)	High Intensity Discharge lamps with GY9.5, PGJX28, G22 caps and with caps not specified in IEC 60061-1
	Photo, Stage Studio Theatre & Video (Discharge)	White light with CCT ≥5500K and power <60W and life is ≤2000h, CRI: >85
	Photo, Stage Studio Theatre & Video (Discharge)	White light with CCT ≤3200K and power <60W and life is ≤2000h, CRI: >90
	Photo, Stage Studio Theatre & Video (Discharge)	White light with CCT ≥3200K and luminous flux per mm2 higher than 264
	Photo, Stage Studio Theatre & Video (Discharge)	Lamps intended for scenes that need to be protected; Like lamps for use in museums
	Medical & Dental	Very difficult to define, many are like general lighting but different ratings and sometimes special caps
	Underwater lamps	Lamps capable of operation in direct contact with water
	Lamps for Science & Industry	White light and basically same types as halogen / incandescent general lighting : very difficult to exclude, hundreds of different models
	Photometric calibration lamps	White light lamps accompanied by an individual calibration certificate detailing the exact radiometric flux under specified conditions
	Lamps with focusing reflector e.g. for coupling into light guides	these lamps are basically not for illumination but for instance for endoscopy, inspection, photopolymerization. The focal point is close to the reflector, criterion could be the relation of focal point to reflector diameter which could for instance be set to max. 1,5
Other special spectrum	Blacklight	Probably Non-white light (depending on white light definition)
	Xenon flash	White light possibly with brightness criteria according to VHK definition, need to check
	Printing	White light according to any of the 245/2009 spectral definitions below
	Photochemical	White light according to any of the 245/2009 spectral definitions below

Special from 245/2009	White light with >6% of SPD in range 250-400nm and/or with peak of SPD in region 280-400nm
Special from 245/2009	White light with >11% of SPD in range 630-780nm
Special from 245/2009	White light with >5% of SPD in range 640-700nm
Special from 245/2009	White light and +/– 5 m (+magenta, –green) colour compensating filter value limit (cc). CIE coordinates x=0,330 y=0,335 and x=0,415 y=0,377
Special from 245/2009	White light CCT=3200 K with chromaticity coordinates x=0,415 y=0,377
Special from 245/2009	White light CCT=5500 K with chromaticity coordinates x=0,330 y=0,335
Special from 245/2009	Lamps having specific effective UV output >2mW/klm

Replacement lamps in appliances

Oven	Incandescent lamps ≤25W and ≤60mm length which endure T=300°C operating temperature without degradation
Cooker hood, refrigerator, sewing machine, hoover	Incandescent lamps ≤25W and ≤60mm length and ≤30mm diameter, resistant to mechanical shock & vibrations
Freezer	- Incandescent lamps ≤25W and ≤60mm length which endure Ta=-20°C ambient temperature without degradation, resistant to mechanical shock & vibrations
Swimming pools, ponds	Lamps capable of operation in direct contact with water

Proposal for exemptions for products to be used in theatre, studio and stage lighting as well as for architectural lighting using coloured LEDs.

Addition to ANNEX 1, exemptions

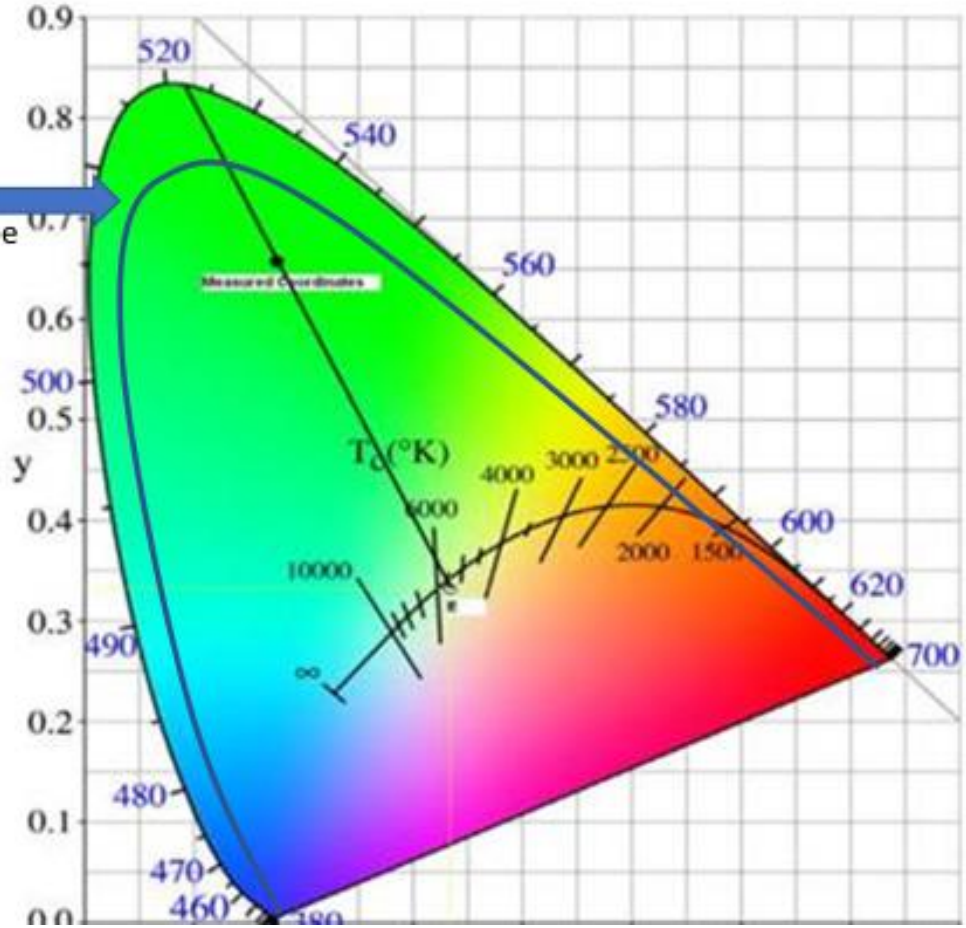
2 In addition, this Regulation shall not apply to:

2 In addition, this Regulation shall not apply to:

(h) Colour-tuneable light source that can be set to at least the colours mentioned in table below and have for each of these colours, measured at the dominant wavelength, a minimum colour purity index according to table below:

Colour	Dominant wave-length range	Minimum colour purity index
Blue	440nm – 490nm	90%
Green	520nm – 540nm	65%
Red	610nm – 670nm	95%

Products in this area are Out of scope



LEDs intended for colour applications typically require high colour saturation. These LEDs are not based on phosphor technology (conversion of light by means of a phosphor) as often used for light sources that are used for general lighting purposes. These (non-phosphor based) coloured LEDs can reach a very high colour saturation, called color purity index. A colour point with a high colour purity index is located close to the locus of the colour space.
So exempting products that could reach area close to the colour space locus would solve issue for theatre, studio, stage, architectural lighting applications.

Colour purity index is defined using the following procedure:
Draw a line from D65 reference point, going through your (x,y) chromaticity, and ending on the locus (outer line of the color space).
The full length of the line represents 100%. The distance between D65 and your (x,y) is then proportionally xx%, and defines your purity ratio. A point on the locus is then fully saturated (100% color purity) whereas the D65 point has zero saturation (0% color purity).