



**LIGHTINGEUROPE**  
THE VOICE OF THE LIGHTING INDUSTRY

**GUIDE  
FOR THE APPLICATION OF THE  
COMMISSION REGULATION (EU)  
NO. 1194/2012 SETTING  
ECODESIGN REQUIREMENTS FOR  
DIRECTIONAL LAMPS, LIGHT  
EMITTING DIODE LAMPS AND  
RELATED EQUIPMENT**

Version 1, 17 July 2013



## ***Letter from the President***

*As President of LightingEurope, I am delighted to present you this GUIDE FOR THE APPLICATION OF THE COMMISSION REGULATION (EU) No. 1194/2012. It is our intention to help all stakeholders to enhance their understanding of the Commission Regulation (EU) No. 1194/2012 SETTING ECODESIGN REQUIREMENTS FOR DIRECTIONAL LAMPS, LIGHT EMITTING DIODE LAMPS AND RELATED EQUIPMENT.*

*This guide is published at a time when the lighting industry is undergoing unprecedented change arising from the introduction of LED technology. It is not exaggerated to say that this new technology will revolutionize our understanding of lighting. It is in this context that LightingEurope has decided to bring you this guidance document in order to enable us all to seize the full opportunities of LED lighting based on a joint understanding of the regulations in place.*

*I am especially privileged to point out that this guide is the result of shared efforts. It represents LightingEurope's unification of industry strengths and is drafted based on the valuable input from lighting companies and national lighting associations to meet the challenges and opportunities created by remarkable new lighting technology and production. LightingEurope will continue to serve as the main platform for development and communication of industry positions while shaping the future of lighting in Europe.*

*Yours sincerely,*

*Dietmar Zembrot*

*President LightingEurope*



## PREFACE

LightingEurope is the industry association representing leading European lighting manufacturers and national lighting associations. LightingEurope is committed to innovation, sustainability, quality and leadership. We contribute to shape policy and establish industry standards and guidelines. We are dedicated to promoting efficient lighting practices for the benefit of the global environment, human comfort, and the health and safety of consumers. For more information please visit <http://www.lightingeurope.org/>.

This Guide is intended to help the market understanding the complex *Commission Regulation (EU) No. 1194/2012* implementing *Directive 2009/125/EC* of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diodes lamps and related equipment.

The information provided in this Guide is the interpretation of the Regulation as understood by the members of LightingEurope. Please note that LightingEurope has also published a questions and answers document about this the Commission Regulation (EU) No. 1194/2012 which is available at LightingEurope website <http://www.lightingeurope.org/>.

The *Commission Regulation (EU) No. 1194/2012* is available on the following website of the European Commission:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:342:0001:0022:EN:PDF>.

All information about the EcoDesign Regulations can be found on the Commission website: [http://ec.europa.eu/energy/efficiency/ecodesign/eco\\_design\\_en.htm](http://ec.europa.eu/energy/efficiency/ecodesign/eco_design_en.htm)

The Regulation for directional lamps, light emitting diodes lamps and related equipment is a product related regulation which is application independent and addresses specific products, such as conventional reflector lamps, LED lamps including LED modules, LED lamps replacing fluorescent lamps without integrated ballast (e.g. linear fluorescent tubes) and the related equipment between the mains and the lamps (e.g. halogen lamp control gear, LED lamp control gear, control devices and luminaires).

Mandatory ecodesign requirements apply to products placed on the market (or put into service) wherever they are installed. Products falling in the scope of this Regulation shall bear the CE marking and the manufacturer shall mention a reference to this Regulation (as well as to the framework directive 2009/125/EC) in his declaration of conformity. Under the boundary conditions of EU-Regulations, "shall" means a "must", a mandatory requirement. For clarity, the same apply to product which are defined such as "for special purposes" and so not subjected to the specific ecodesign requirements set-out in Annex III of the Regulation. Even if the product is exempted from the regulation, e.g. being "for special purposes", it shall be marked with

"CE" and reference being made to EU Regulation 1194/2012 in the EC declaration of conformity.

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# 1 Summary – Highlights of Requirements

The following flow-charts provide a simplified overview of process relevant to specific requirements applicable to each category of products covered.

Once the relevant type of product have been individuated, it would be possible in having direct link to relevant information by hyperlinks provided with flow-charts.

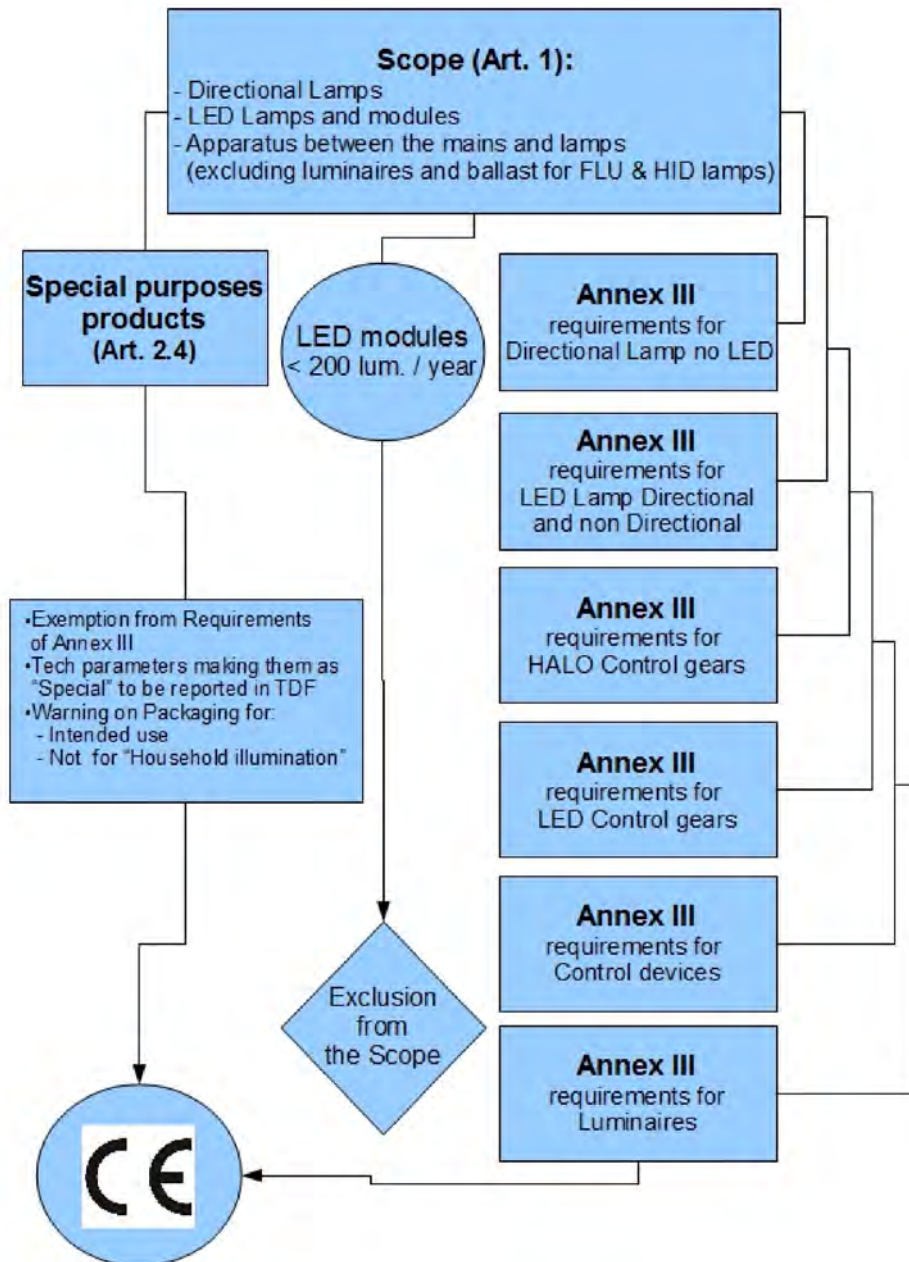


Figure 1 - General overview showing categories of products covered by the scope, including for special purposes and the exclusions.

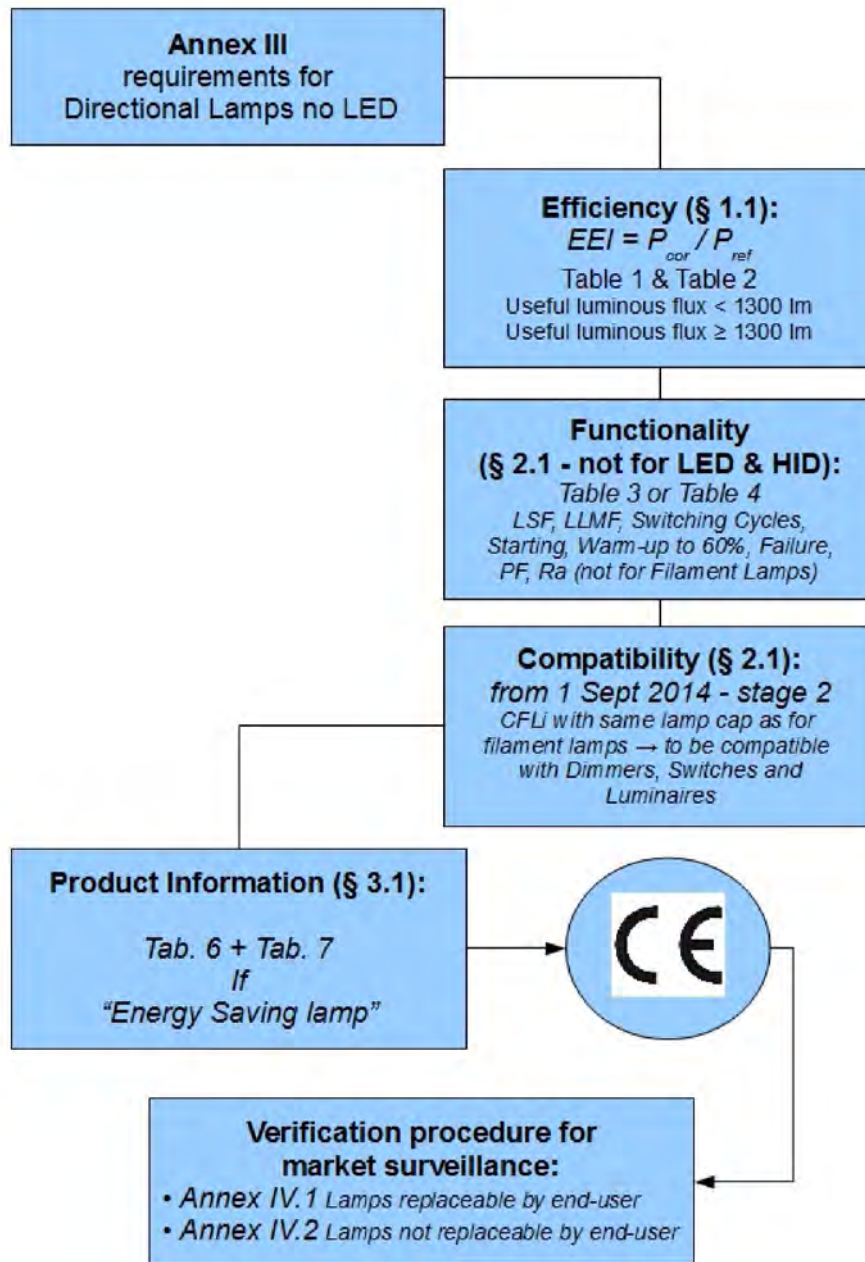


Figure 2 - Process to apply to Directional LED lamps (ref. 6.1)



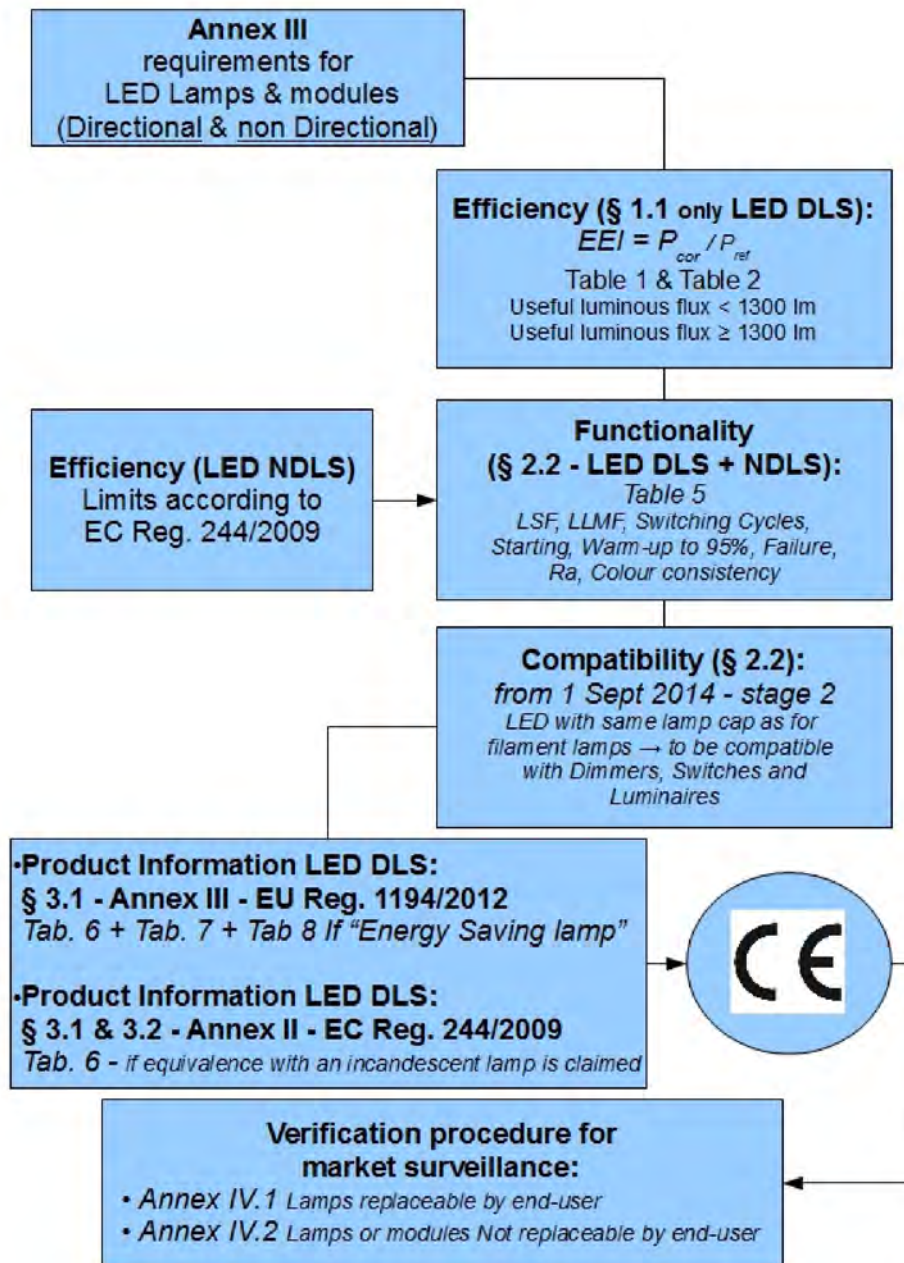


Figure 3 - Process to apply to Directional and Non-Directional LED lamps and modules (ref. [2])

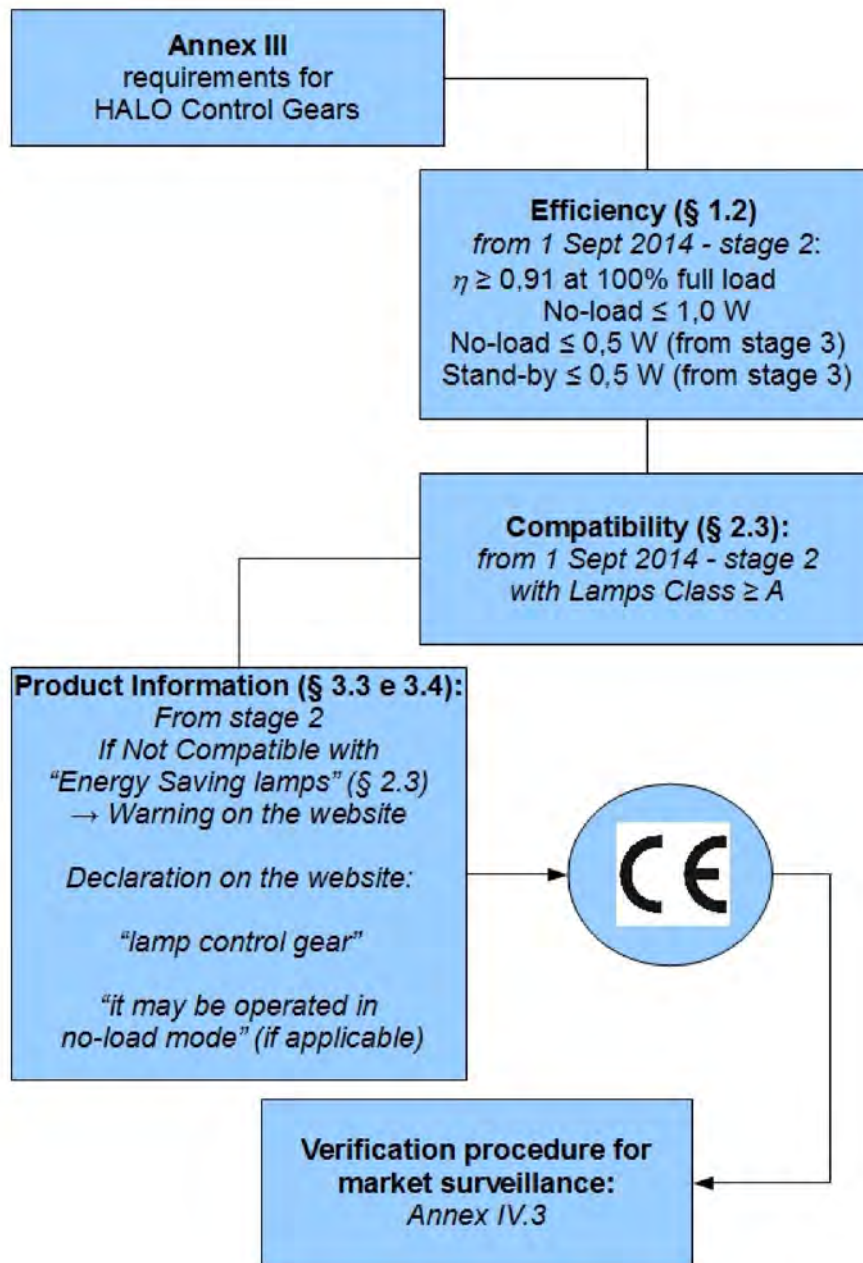


Figure 4 - Process to apply to Controgears for halogen lamps (ref. 7.1)

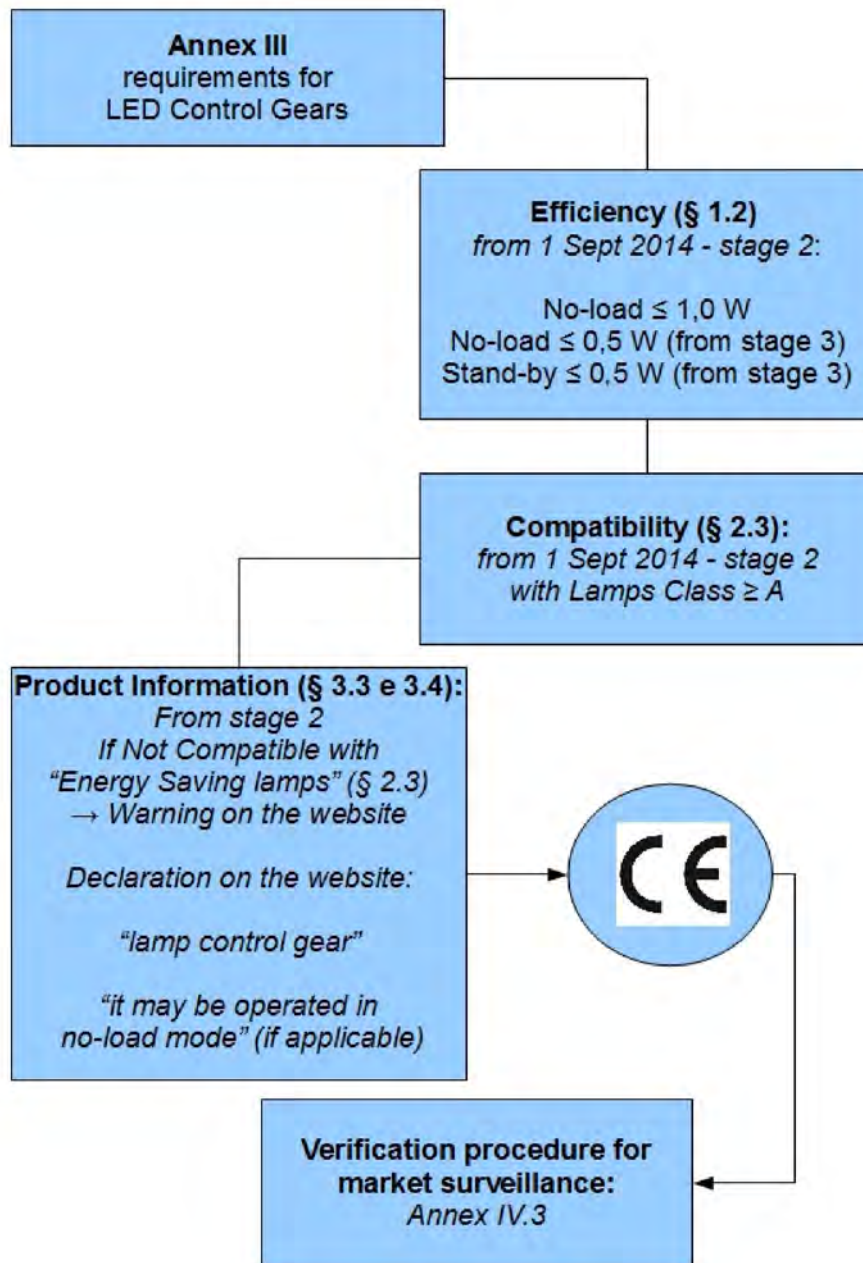


Figure 5 - Process to apply to Controgears for LED lamps and modules (ref. 7.2)

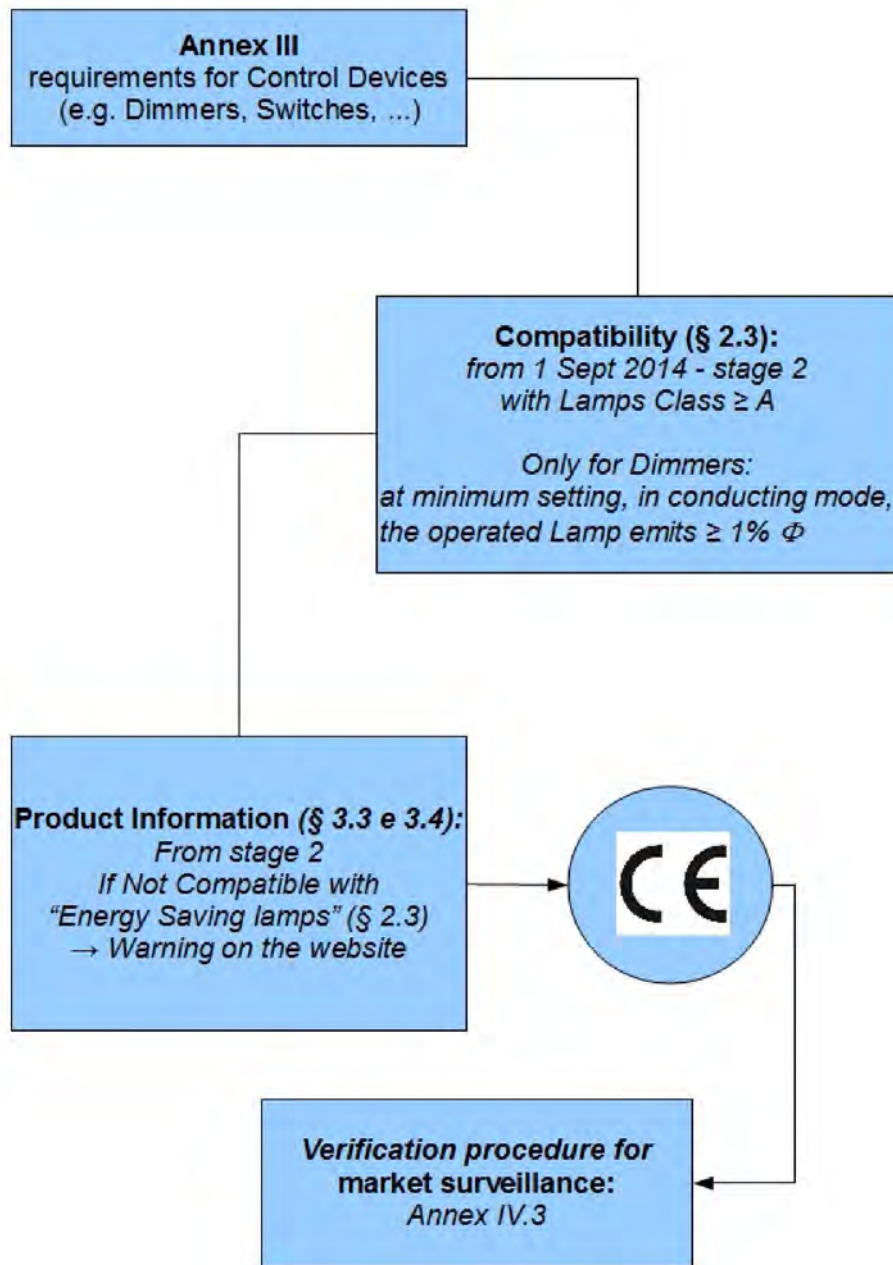


Figure 6 - Process to apply to lamp control devices (e.g. dimmers and switches - ref. 7.3)

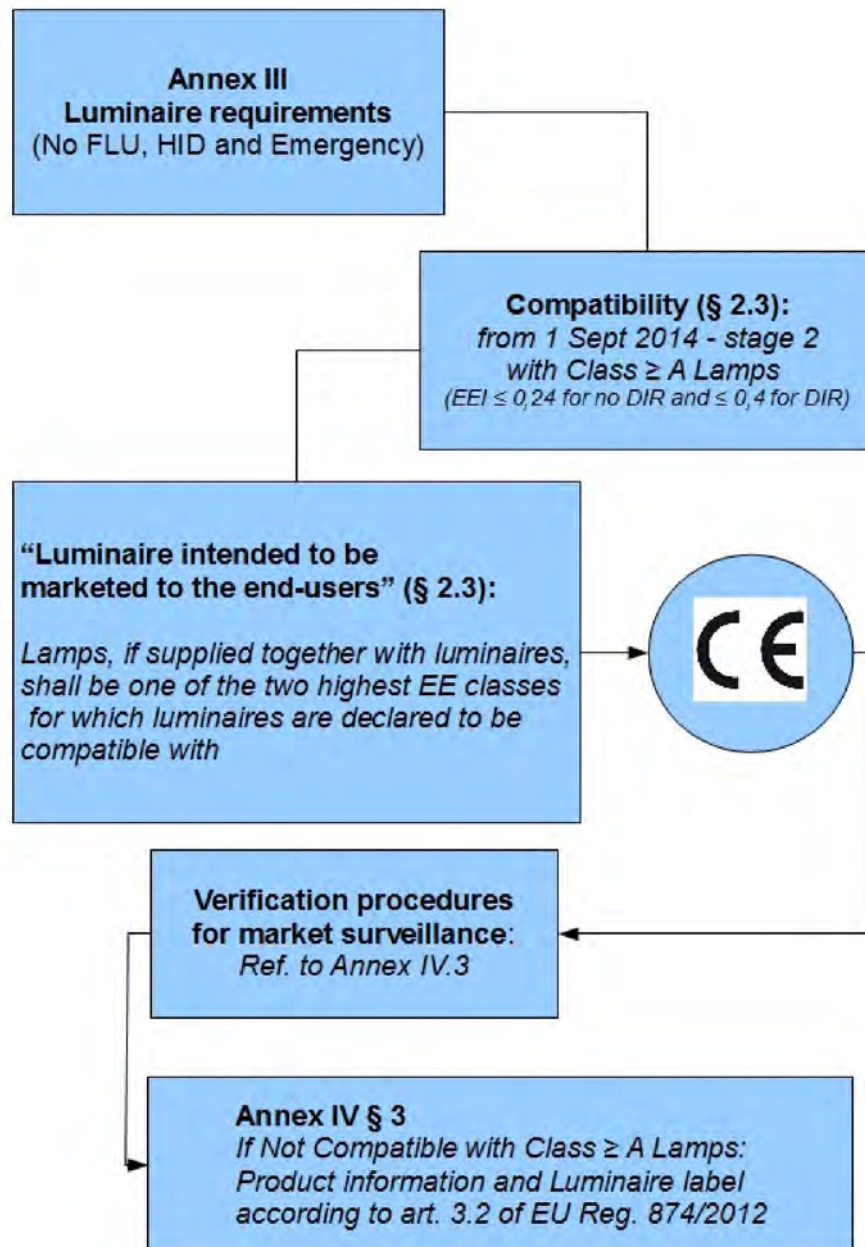


Figure 7 - Process to apply to Luminaires (other than for fluorescent or HID lamps and for emergency lighting - ref. 7.4)

## 2 HIGHLIGHTS

### *Highlights with regard to lamps*

#### **2.1 Conventional reflector lamps**

When the first stage will entry into force on 1<sup>st</sup> September 2013 the changes will be hard to see for non-experts, because predominantly effect will be the transition from less efficient towards more efficient types within the same technology. The only technology change will be that from 1<sup>st</sup> September 2014, when all incandescent types will be phased-out, but as a replacement the consumer can still buy a more efficient halogen version. The halogen replacements offer the same quality of light as the incandescent types, so that it will be hard to see a difference. Another alternative for people who aim for more energy savings will be LED retrofits, which are in many cases a good alternative. With regards to the mains voltage halogen we are confident that these lamps will only be phased-out in 2016 if there is an “affordable” and real alternative, which fits the need of the customers.

#### **2.2 LED lamps including LED modules**

LED lamps and LED modules are mostly regarded in the same way: A LED lamp includes one or more LED modules and a cap whereas the module does not have a cap. As of stage one, 2013, the energy efficiency of LED directional lamps and modules is prescribed to be class A (or best class B products). As of stage three, 2016, LED directional lamps and modules need to meet energy efficiency class A+ (or best class A products). From stage one -2013- onwards, functional requirements are valid for both LED directional lamps and non-directional lamps. These requirements typically relate to lamp survival rates and lumen maintenance, switching cycles, starting and warm up times, premature failure rates, color rendering and consistency, and finally the power factor. Also requirements are prescribed when a LED lamp can be marketed to be “retrofit” to existing lamp types, based on a minimum lumen output requirement. Also requirements on packaging and other communication material/channels become obligatory as of 1<sup>st</sup> September 2013 onwards.

## 2.3 LED lamps replacing fluorescent lamps without integrated ballast

LED lamps replacing fluorescent lamps without integrated ballast are mostly regarded in the same way as LED lamps (reference to chapter 2.2): A LED lamp includes one or more LED modules. For LED lamps replacing fluorescent lamps it has to be evaluated if they are directional lamps or non-directional lamps. As of stage one, 2013, the energy efficiency of LED directional lamps is prescribed to be class A (or best class B products). As of stage three, 2016, LED directional lamps need to meet energy efficiency class A+ (or best class A products). For non directional lamps no energy efficiency requirements exist. From stage one -2013- onwards, functional requirements are valid for both LED directional lamps and non-reflector lamps. These requirements typically relate to lamp survival rates and lumen maintenance, switching cycles, starting and warm up times, premature failure rates, colour rendering and consistency, and finally the power factor. Also requirements are prescribed when a LED lamp can be marketed to be “retrofit” to existing fluorescent lamp wattages. To use the name retrofit based on lamp wattage equivalence also requirements on packaging and other communication material/channels become obligatory as of 1st September 2013 onwards.

## 2.4 HID lamps

Here only the directional HID lamps are affected. The requirements relate to energy efficiency but there are no functionality requirements. The limits imposed on the 1<sup>st</sup> September 2013 will affect very few lamps because most lamps are sufficiently efficient. The limits will be more demanding beginning with 1<sup>st</sup> September 2016 so here the least efficient directional HID lamps will disappear.

Additionally there are requirements pertaining to product information which has to be published on free-access websites and on technical data sheets.

## 2.5 Halogen lamp control gear

**LightingEurope note:** LightingEurope recommends that the transition to the second and third stage requirements of efficiency, no-load and standby power requirements will be started soon. If totally new products need to be developed, the manufacturers should consider going directly to third stage requirements as there is only two years transition time between the 2<sup>nd</sup> and 3<sup>rd</sup> stages.

Manufacturers shall indicate in their product information if the control gear is intended for no-load operation. This is to inform that the control gear complies with the no-load power requirement and the luminaire manufacturer or installer is allowed to install a switch between the lamp and the control gear. Magnetic transformers, which are widely used to operate extra low voltage halogen lamps, will be practically phased out from applications which require switch between the lamp and the transformer, as they cannot comply with the no-load power requirement and/or the efficiency requirement. Magnetic transformers may comply with the requirements in high power types not intended for no-load operation, but may be too expensive, heavy and big to compete with corresponding electronic halogen control gears.

Transformers are widely used in applications where the distance between the lamp and the control gear is long, over 2 m or more. Typical electronic high frequency output halogen control gears are not suitable for this kind of applications. Transformers may be replaced by DC output control gears in these applications.

As the functionality requirements set in Annex III 2.3 clause (of the EU Regulation) are not clearly defined until the relevant standards will be available, the manufacturers are advised to judge if the warning notice according to Annex III clause 3.3 (of the EU Regulation) is needed. Particularly it should be considered if the control gear is capable of operating at much lower load than the halogen lamp power it is designed for.

Many current halogen control gears are not capable of operating the loads less than 20% of the rated load.

## **2.6 LED lamp control gear**

Ecodesign requirements for the LED controlgears are the same as for halogen control gear except that there is no efficiency requirements for LED control gear for the time being. It is expected that this requirement will come later (in the next review of the regulation). LED control gear may comprise more than one separate physical units, e.g. power supply unit, control unit(s) and dimmer unit (s), which may be connected together in various configurations. The definitions and requirements cover most of these configurations.



## 2.7 Control devices

Control device means an electronic or mechanical device controlling or monitoring the luminous flux of the lamp by other means than power conversion, such as timer switches, occupancy sensors, light sensors and daylight regulating devices. In addition, phase cut dimmers shall also be considered as control devices. (Definition (23) in article 2 of the regulation).

The regulation does not state any efficiency, standby or no-load requirements for control devices, but there are the same compatibility requirements as for controlgears to be compatible with A class or better lamps unless there is a warning notice on noncompatibility with these classes. New requirement is that minimum dimming setting of the control device shall produce at least 1% of the full load luminous flux.

## 2.8 Luminaires

The ecodesign requirements applicable to luminaires, are not related specifically to the luminaire efficiency.

Lamp characteristics and the compatibility of the luminaire with specific type of lamps are the main ecodesign requirements for luminaires set out in this Regulation.

Annex IV (of the EU Regulation) allows the possibility to provide specific information in case of luminaires not compatible with high efficiency class lamps (with reference to Regulation 874/2012).

The information related to the lamp type/s compatible with the luminaire shall be always provided; this also in the case of lamp re-sold by the luminaire manufacturer when embedded in the luminaire package, together with the luminaire.

The LED luminaires, when provided with LED modules, are manufactured with components (e.g. modules, lamp controlgears and lamp control devices, if any) which shall be in compliance with Ecodesign requirements both for energy efficiency and functionality for lamps.

LED modules can be placed on the market as CE products directly by specific importer/responsible vendor or supplied as specific part for luminaire manufacture, directly by luminaire manufacturer. The manufacturer of LED luminaire shall identify his position with respect to the responsibility deriving by the commercial activity, and prove that the modules comply with the relevant Ecodesign requirements.

### 3 Introduction

Within the framework of Kyoto 1997 climate protection objectives, the EU defined a series of measures for the economical and sustainable use of resources. After prohibiting less efficient conventional ballasts for fluorescent lamp in EU Directive 2000/55/EC (repealed by EC Regulations 245/2009 and 347/2010), reducing hazardous materials content as part of EU Directive 2002/95/EC (RoHS, repealed by 2011/65/EU), and regulating the disposal of discarded electronic devices in EU Directive 2002/96/EG (WEEE, repealed by 2012/19/UE), the EU issued a framework directive, EU Directive 2005/32/EC, to define requirements for acceptable environmental design (eco-design) of energy-using products (EuP). In November 2009, this directive was replaced with an updated framework directive, EU Directive 2009/125/EC, relating to the eco-design of energy-related products (ErP). This change did not affect implementing measures already issued.

These Implementing Measures for non directional household lamps (EC Regulation 244/2009) and tertiary sector lighting products e.g. fluorescent and high-pressure discharge lamps and control gears (EC Regulation 245/2009) reflect EU climate targets set at the beginning of 2007 that extend to 2020. The core objective of these ambitious goals is to reduce CO<sub>2</sub> emissions in the EU by 20% by 2020. In the professional lighting sector, reductions of just over 20 million metric tons of CO<sub>2</sub> are being targeted and another 24 million metric tons in consumer lighting.

This guidance document from the lighting industry is about the third implementing measure for lighting, which completes the existing lighting measures by setting requirements for directional, but also for light emitting diode lamps (including modules) and related equipment, which covers everything between the mains and the light source. The most significant difference to the existing measures is that now not only the light source itself is in the focus, but also the related equipment by setting compatibility requirements.

But of course impact on light source is the focus of this measure, by:

- making quality criteria (functionality requirements) for all LED lamps and modules mandatory for the first time
- phasing-out incandescent reflector lamps by 1<sup>st</sup> September 2014
- setting minimum efficiency and functionality requirements for all reflector (directional) lamps
- requiring a market assessment for the European Commission in 2015 to assess whether some types of mains-voltage halogen lamps (e.g. GU10) will be phased-out on 1<sup>st</sup> September 2016.

For the purpose of this Guide the term light source means lamp or LED module. Where the Regulation uses the term (LED) lamp this also includes LED module.

### **3.1 Entry into force**

The new ecodesign regulation applies from 1<sup>st</sup> September 2013.

It entered into force on 3<sup>rd</sup> of January 2013 (publication in the Official Journal of the European Union on 14 December 2012) and is legally binding in its entirety and directly applicable in all Member States.

### **3.2 Transitional provisions**

To avoid additional costs for lamps that will be phased-out in 2014 anyhow, these products are exempted from the product information requirements of this regulation.

## 4 Scope and exclusions

### 4.1 Products covered

This Regulation establishes ecodesign requirements for placing on the market<sup>1</sup> the following electrical lighting products:

- 1) Directional lamps according to definition: "at least 80 % light output within a solid angle of  $\pi$  sr (corresponding to a cone with angle of  $120^\circ$ )";

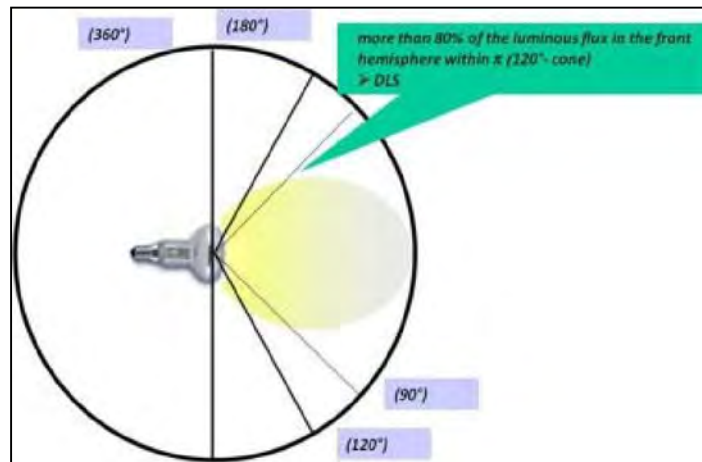


Figure 8 - Directional lamp

- i) directional Incandescent, Halogen, CFLi, HID and LED lamps



Figure 9 - examples of directional lamps

- ii) directional LED modules



Figure 10 - Example of directional LED modules

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<sup>1</sup> For the definition of "Placing on the market" and relevant position paper from LightingEurope refer to Annex II.

- iii) directional LED lamps replacing Linear Fluorescent Tubes (to note that usually they are non-directional)



Figure 11 - Examples of LED lamps replacing linear fluorescent tubes

- 2) Non-directional light-emitting diode (LED) lamps (for functionality parameters)
  - i) Non-directional LEDi lamps ('i' for integrated)



Figure 12 - Examples of non-directional LED lamps

Note: other EcoDesign requirements (energy efficiency and product information) are in EC Regulation 244/2009.

- ii) Non-directional LED modules (for functionality parameters)



Figure 13 - Examples of non-directional LED modules

Note: other EcoDesign requirements (energy efficiency and product information) are in EC Regulation 244/2009.

- iii) Non-directional LED lamps replacing Linear Fluorescent Tubes



Figure 14 - Examples of non-directional LED tube lamps

Note: other EcoDesign requirements (energy efficiency and product information) are in EC Regulation 244/2009.

- 3) Equipment designed for installation between the mains and the lamps, including lamp control gear, control devices and luminaires used with LED and Halogen lamps (other than ballasts and luminaires for fluorescent and high-intensity discharge lamps are excluded because they are covered by EC Regulation 245/2009);



Figure 15 - Examples of equipment designed for installation between the mains and the lamps

including when they are integrated into other products (home appliance, furnitures, etc).

- 4) Battery operated lighting products are included in the scope of EC Regulation 1194/2012 (even if they are excluded from regulation 874/2012)



Figure 16 - Examples of battery operated lamps and luminaires

## 4.2 Products excluded

- LED modules, when they are marketed as part of luminaires that are placed on the market in less than 200 units per year, shall be exempted from the requirements of this Regulation. For example, in case of 10 modules per luminaire, 2000 LED modules are excluded from the scope of EU regulation 1194/2012 when maximum 10 same luminaires per year are placed on the EU market.
- Luminaires with fluorescent and/or with HID lamps as they are already covered by the EcoDesign Regulation 245/2009 for tertiary lighting products.



<b>Flood Lighting</b>	
<b>Luminaires</b>	<b>Lighting applications</b>
 <p>HID Lamp floodlight (e.g. operating RX7s 150W)</p>	

Figure 17 - Example of luminaire excluded - RX7s flood lighting



<b>Office Lighting</b>	
<b>Luminaires</b>	<b>Lighting applications</b>
 <p>Office pendant luminaire (e.g. operating T5 linear fluorescent lamps)</p>	

Figure 18 - Example of luminaire excluded - T5 lamps luminaire for office lighting


<b>Street, road and amenity lighting</b>	
<b>Luminaires</b>	<b>Lighting applications</b>
 <p>Street lighting (e.g. operating Metal Halide lamps)</p>	

Figure 19 - Example of luminaire excluded - MH lamps luminaire for street lighting

- Lamp control gear for fluorescent and lamp control gear for HID lamps as they are already covered by the EcoDesign Regulation 245/2009 for tertiary lighting products.



Figure 20 - Examples of lamp control gear for fluorescent and HID lamps

### 4.3 Special Note concerning Linear LED Lamps

#### 4.3.1 Determination of Directionality

The Regulation provides no details on how the luminous flux of linear LED lamps (e.g. LED tubes replacing linear fluorescent lamps) should be evaluated in the 120° cone



( $\pi S_r$ ) in order to determine the useful luminous flux ( $\Phi_{USE}$ ), in case the product matches the definition of a directional lamp.

Following the standard procedure of the Regulation, it must first be determined whether the lamp in question is a Non-Directional Light Source (NDLS) or a Directional Light Source (DLS). This is simple to identify for most lamps which have a symmetrical light distribution, but the Regulation is ambiguous when it comes to linear products. For instance, a typical LED tube may be intended as directional in the planes perpendicular to its axis (known as the A-planes, one of which is shown in green in Figure 19), but at the same time may be intended as non-directional in the planes parallel to its axis (known as the B-planes, two examples of which are shown in blue and red in Figure 19).

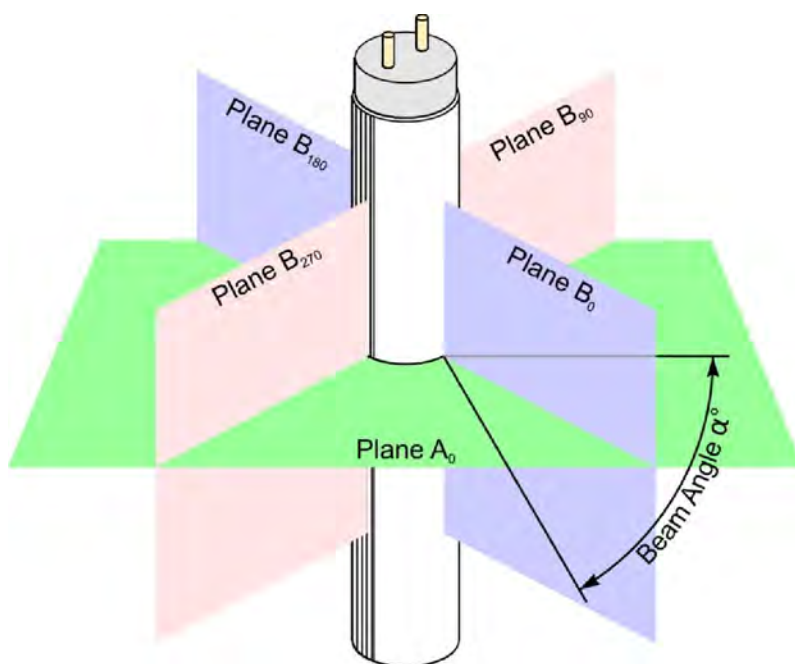


Figure 21 – Illustration showing the significant measurement planes for a directional linear light source

Owing to the fact that both LED and Fluorescent lamps generally have a similar distribution in the plane B0 but can be very different in the plane A0, it is considered to be of greatest importance to differentiate directional from non-directional products by their distribution in the A0 plane.

Successful measurement of LED tubes in multiple planes on some equipment types would require the distance between the lamp and the goniophotometer head to be very great, such that the linear lamp approximates a point source. This might be hard to apply from the practical point of view, for instance in case the room containing the goniophotometer is not large enough.

In case manufacturers should wish to quote a beam angle for LED tubes replacing linear fluorescent lamps, then it may be the angle  $\alpha$  in plane A0 as illustrated in Fig. 21.

## 5 Special purpose products (Requirements for special purpose products)

The Regulation is setting product information requirements for special purpose products. Beside the request for information there are no specific ecodesign requirement for "special purpose product" in this regulation.

### Definition

**Special purpose product'** means a product that uses the technologies covered by this Regulation but is intended for use in special applications because of its technical parameters as described in the technical documentation. Special applications are those that require technical parameters not necessary for the purposes of lighting average scenes or objects in average circumstances.

### 5.1 Product information requirements for special purpose products

If the chromaticity coordinates of a light source always fall within the following range:

$$— x < 0,270 \text{ or } x > 0,530$$

$$— y < - 2,3172 x^2 + 2,3653 x - 0,2199 \text{ or } y > - 2,3172 x^2 + 2,3653 x - 0,1595;$$

the chromaticity coordinates shall be stated in the technical documentation file drawn up for the purposes of conformity assessment in accordance with Article 8 of Directive 2009/125/EC, which shall indicate that these coordinates make them a special purpose product. See the following diagram for visualisation.

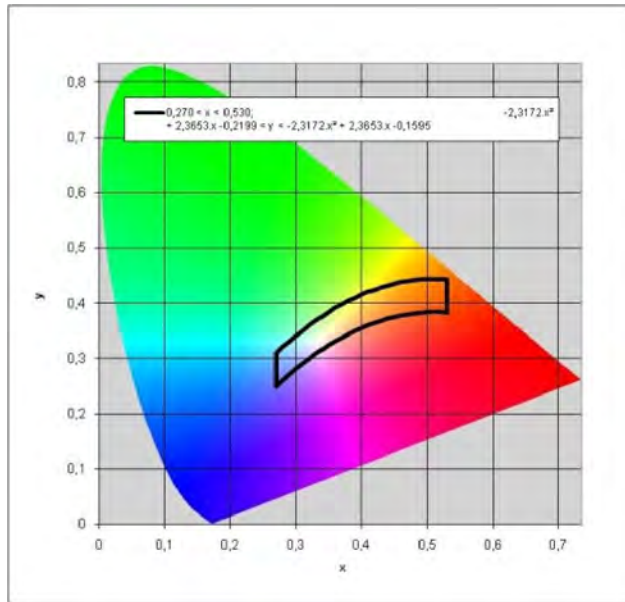


Figure 22 - Chromaticity coordinates related to special purpose products

For all special purpose products, the intended purpose shall be stated in all forms of product information, together with the warning that they are 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 for the stated intended purpose (e.g. size, shape, spectral distribution, temperature or mechanical resistance, etc). If needed, the parameters may be listed in such a way as to avoid disclosing commercially sensitive information linked to the manufacturer's intellectual property rights.

If the product is placed on the market in a packaging containing information to be visibly displayed to the end-user prior to purchase, the following information shall be clearly and prominently indicated on the packaging and in all other forms of product information (e.g. pictograms or other graphical elements):

- the intended purpose; and
- that it is not suitable for ordinary lighting in household room illumination.

See following pictogram registered by the ELC worldwide and now transferred to LightingEurope. The use of this pictogram is free but a notification sent to the LightingEurope Secretariat is required ([info@lightingeurope.org](mailto:info@lightingeurope.org)).



Figure 23 - Pictogram indicating " Not suitable for ordinary lighting in household room illumination"

## 5.2 Categories for special application

They can be grouped into the following categories:

### a) applications where the primary purpose of the light is not lighting, such as:

- i. emission of light as an agent in chemical or biological processes (such as polymerisation, ultraviolet light used for curing/drying/hardening, photodynamic therapy, horticulture, petcare, anti- insect products);
- ii. image capture and image projection (such as camera flashlights, photocopiers, video projectors);
- iii. heating (such as infrared reflector lamps with ruby-red, clear or satinized bulb);
- iv. signalling (such as traffic control, railway signalling or airfield lamps);

### b) lighting applications where:

- (i) the spectral distribution of the light is intended to change the appearance of the scene or object lit, in addition to making it visible (such as food display lighting or coloured lamps as defined in point 1 of Annex I of the EU Regulation), with the exception of variations in correlated colour temperature; or
- (ii) the spectral distribution of the light is adjusted to the specific needs of particular technical equipment, in addition to making the scene or object visible for humans (such as studio lighting, show effect lighting, theatre lighting); or
- (iii) the scene or object lit requires special protection from the negative effects of the light source (such as lighting with dedicated filtering for photosensitive patients or photosensitive museum exhibits); or
- (iv) the lighting products have to withstand extreme physical conditions (such as vibrations or temperatures below  $- 20\text{ }^{\circ}\text{C}$  or above  $50\text{ }^{\circ}\text{C}$ ); e.g. shock and temperature proof „rough service” lamps;

- (v) lighting is required only for emergency situations (such as emergency lighting luminaires or control gears for emergency lighting);  
Please note that emergency lighting luminaires are special purpose products according to this Regulation. Also the controlgears designed to operate lamps in luminaires under emergency lighting conditions are special purpose products according to this Regulation. Although the regulation at this point is not explicitly stated, the purpose of the regulation is that the controlgears capable of operating both in non-emergency luminaires and in emergency lighting luminaires are not exempted from specific ecodesign requirements.



Figure 24 - LED emergency lighting luminaires are "Special purpose products"

### (c) lighting products incorporated into others

Lighting products which are incorporated into other appliance, product or similar where its primary purpose is not lighting and the product is dependent on energy input in fulfilling its primary purpose during use (such as refrigerators, sewing machines, endoscopes, blood analysers, LCD TV set) are matching the definition of "products for special purposes".

**LightingEurope note:** EU Regulation 1194/2012 implements ecodesign requirements and information requirements for electric lighting products and information requirements for special purpose products. The following flowchart provides the industry interpretation whether a product or a product component is in scope and subject to ecodesign and/or information requirements. As an example, a lamp for a video projector is a special purpose product according to article 2.4 of the regulation and is subject to information requirement in case the lamp is placed on the market as individual product (e.g. spare part), but not subject to the information requirement in case placed on the market as component of the video projector".

A product becomes a special purpose product if it fits into the definition of Article 2.4. Coloured lamps are mentioned in 2.4.(b).(i). They need to fulfil the product information requirements in Annex I.1 of the EU Regulation.

If and only if products become special purpose products solely based on the definition

in Article 2(4)(c), it is sufficient to state the name, type, or description of the product, such as being a "remote control" or "refrigerator", which already indicate clearly that they are not suitable for household room illumination. This information is sufficient to specify the intended purpose of the product itself, and explain what makes the product specific for its intended purpose. Note that this answer applies only to this regulation as other lamp regulations use different definitions.

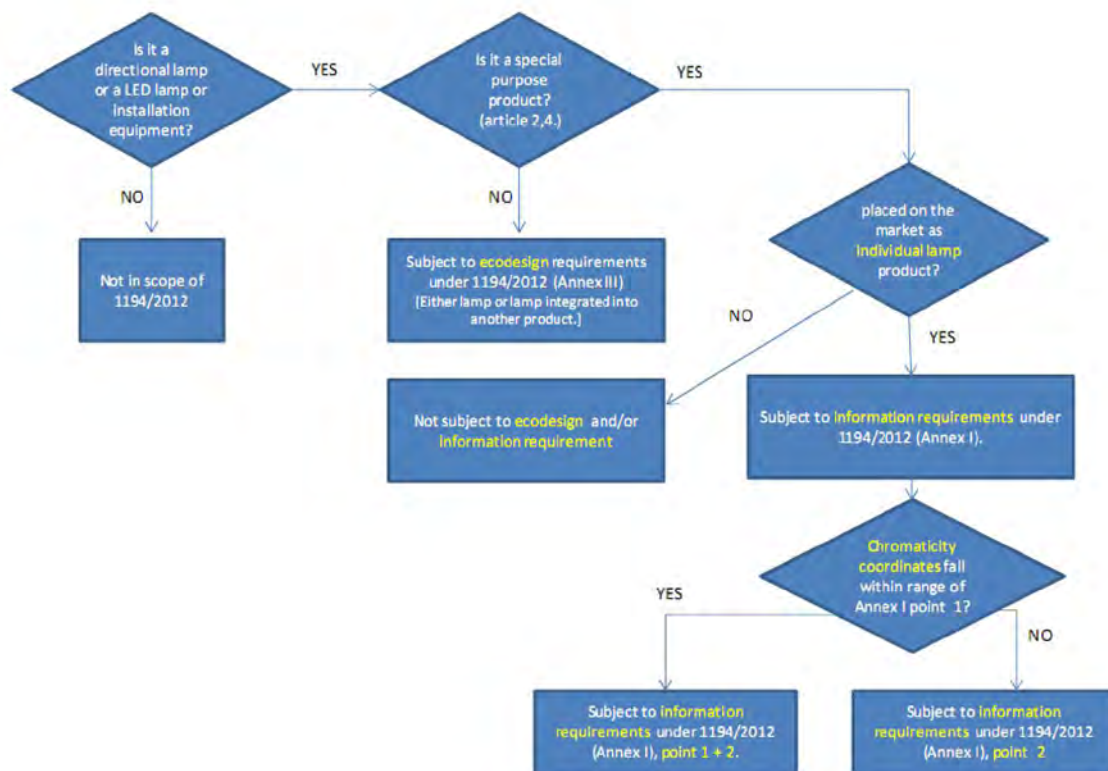


Figure 25 - Flow-chart on determining a "Special purposes product"

## **6 Ecodesign requirements and verification procedures for lamps and LED modules (Annex III and Annex IV of the EU Regulation 1194/2012)**

This section wishes to provide guidance in line with structures shown in flowcharts as in introductory part of the document. In particular the following subclauses refer to relevant ecodesign requirements and verification procedures for each category of products:

- Directional lamps other than LED (incandescent, halogen, compact fluorescent with integrated controlgear and high intensity discharge lamps);
- LED lamps and LED modules (both directional and non-directional);
- equipment designed for installation between the mains and the lamps, including lamp control gear, control devices and luminaires (other than ballasts and luminaires for fluorescent and high-intensity discharge lamps).

### **6.1 EcoDesign requirements for Incandescent & Halogen, CFLi and HID directional lamps**

Ecodesign requirements are split in three areas: energy efficiency, functionality parameters and product information.

#### **6.1.1 Energy Efficiency requirements (e.g. Incandescent & Halogens, CFLi and HID directional lamps)**

*The energy efficiency class results from the energy efficiency index (EEI), which is calculated as follows and rounded to two decimal places:  $EEI = P_{cor} / P_{ref}$*

Where:

$P_{cor}$  is the rated power measured at nominal input voltage and corrected where appropriate in accordance with Table 1. The correction factors are cumulative where appropriate.

**Table 1 - Correction factors (derived from Table 1 of the EU Regulation)**

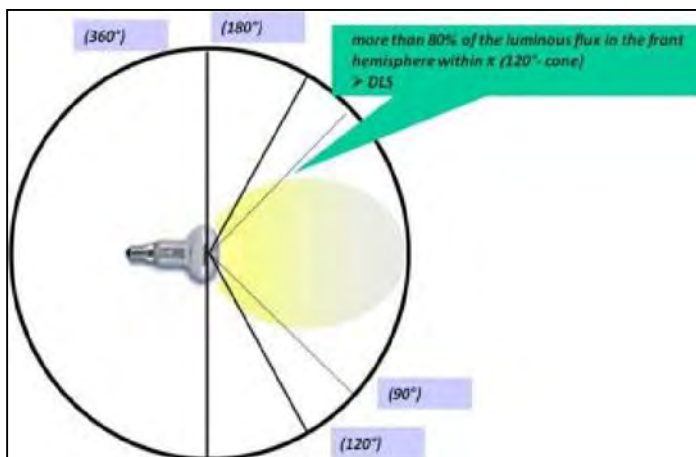
Scope of the correction	Corrected power (P <sub>cor</sub> )
Lamps operating on external halogen lamp control gear	Prated x 1.06
Fluorescent lamps of 16 mm diameter (T5 lamps) and 4-pin single capped fluorescent lamps operating on external fluorescent lamp control gear	Prated x 1.10
Other lamps operating on external fluorescent lamp control gear	Prated x $\frac{0.24\sqrt{\Phi_{use}} + 0.0103\Phi_{use}}{0.15\sqrt{\Phi_{use}} + 0.0097\Phi_{use}}$
Lamps operating on external high-intensity discharge lamp control gear	Prated x 1.10
Compact fluorescent lamps with colour rendering index $\geq 90$	Prated x 0.85
Lamps with anti-glare shield	Prated x 0.80

P<sub>ref</sub> is the reference power obtained from the useful luminous flux of the lamp ( $\Phi_{use}$ ) by the following formula:

For models with  $\Phi_{use} < 1300$  lumen:  $P_{ref} = 0.88\sqrt{\Phi_{use}} + 0.049\Phi_{use}$

For models with  $\Phi_{use} \geq 1300$  lumen:  $P_{ref} = 0.07341\Phi_{use}$

The useful luminous flux ( $\Phi_{use}$ ) is only that part of the luminous flux emitted within a certain angle in axial direction.





The angles considered are:

- 120 ° for directional lamps with a beam angle  $\geq 90^\circ$  other than filament lamps and carrying a warning on their packaging in accordance with point 3.1.2(j) of Annex III of the EU Regulation
- 90 ° for all other directional lamps

For the resulting EEI the following limits apply in the different stages.

**Table 2 - Maximum energy efficiency indexes (derived from Table 2 of the EU Regulation)**

Application date	Maximum energy efficiency index (EEI)			
	Mains-voltage filament lamps	Other filament lamps	High-intensity discharge lamps	Other lamps
Stage 1 September 2013	If $\Phi_{\text{use}} > 450 \text{ lm}$ : 1,75	If $\Phi_{\text{use}} \leq 450 \text{ lm}$ : 1,20 If $\Phi_{\text{use}} > 450 \text{ lm}$ : 0,95	0,50	0,50
Stage 2 September 2014	1,75	0,95	0,50	0,50
Stage 3 September 2016	0,95	0,95	0,36	0,20

Based on the calculations above and the typical properties of the various lamp types the following impact of the Ecodesign requirements at the different stages can be expected.

In some cases where the lamps are not far from the limits it can depend on wattage and other parameters and also on the expertise of the individual lamp manufacturer if their products are complying with the requirements or if the lamps have to be phased out.

**Table 3 - Foreseen impact of Ecodesign requirements on existing directional lamps (ref. to year 2012)**

	Stage 1 (1.9.2013)	Stage 2 (1.9.2014)	Stage 3 (1.9.2016)
R50, R63, R80, R95, R120 >450lm	> 450lm: 1.75 & 1.000h	1.75 & 2.000h	0.95* & 2.000h
R50, R63, R80, R95, R120 ≤450lm		1.75 & 2.000h	0.95* & 2.000h
R63 Eco, R80 Eco, R95 Eco, R100 Eco >450lm	> 450lm: 1.75 & 1.000h	1.75 & 2.000h	0.95* & 2.000h
R50 Eco, R63 Eco, R80 Eco ≤450lm		1.75 & 2.000h	0.95* & 2.000h
MR16 >450lm	0.95 & 2.000h	0.95 & 2.000h	0.95 & 4.000h
MR16 ≤450lm	1.2 & 2.000h	0.95 & 2.000h	0.95 & 4.000h
MR11 >450lm	0.95 & 2.000h	0.95 & 2.000h	0.95 & 4.000h
MR11 ≤450lm	1.2 & 2.000h	0.95 & 2.000h	0.95 & 4.000h
LEDi-R (PAR16)	0.5	0.5	0.2
PAR 16 >450lm	1.75 & 1.000h	1.75 & 2.000h	0.95* & 2.000h
PAR 16 ≤450lm		1.75 & 2.000h	0.95* & 2.000h
PAR20, PAR30, PAR38 >450lm	1.75 & 1.000h	1.75 & 2.000h	0.95* & 2.000h
PAR20, PAR30, PAR38 ≤450lm		1.75 & 2.000h	0.95* & 2.000h
AR48 / AR70 >450lm	0.95 & 2.000h	0.95 & 2.000h	0.95 & 4.000h
AR48 / AR70 ≤450lm	1.2 & 2.000h	0.95 & 2.000h	0.95 & 4.000h
AR111 >450lm	0.95 & 2.000h	0.95 & 2.000h	0.95 & 4.000h
AR111 ≤450lm	1.2 & 2.000h	0.95 & 2.000h	0.95 & 4.000h
CFLi-R	0.5	0.5	0.20
HID-R	0.5	0.5	0.36
LEDi-R (MR16)	0.5	0.5	0.2

### 6.1.2 Stage 3 for mains voltage directional halogen lamps

*“Stage 3 for mains-voltage filament lamps shall apply only if no later than 30 September 2015, evidence is produced by the Commission through a detailed market assesment and communicated to the Consultation Forum that there are mains-voltage lamps on the market that are:*

- *compliant with the maximum EEI requirement in stage 3;*
- *affordable in terms of not entailing excessive costs for the majority of end-users;*

- *broadly equivalent in terms of consumer-relevant functionality parameters to mains-voltage filament lamps available on the date of entry into force of this Regulation, including in terms of luminous fluxes spanning the full range of reference luminous fluxes listed in Table 6;*
- *compatible with equipment designed for installation between the mains and filament lamps available on the date of entry into force of this Regulation according to state-of-the-art requirements for compatibility.”*

**LightingEurope note:** only if evidence for this is produced in a detailed market assessment, mains-voltage filament lamps have to achieve the stage 3 requirements.

### 6.1.3 Functionality requirements (for INC & HALO, CFLi directional lamps)

**Table 4 - Functionality requirements for directional compact fluorescent lamps - CFLi (derived from Table 3 of the EU Regulation)**

Functionality parameter	Stage 1 except where indicated otherwise	Stage 3
Lamp survival factor at 6000h	From 1 March 2014: $\geq 0.50$	$\geq 0.70$
Lumen maintenance	At 2000h : $\geq 80\%$	At 2000h: $\geq 83\%$ At 6000h: $\geq 70\%$
Number of switching cycles before failure	$\geq$ half the lamp lifetime expressed in hours $\geq 10000$ if lamp starting time $> 0,3s$	$\geq$ lamp lifetime expressed in hours $\geq 30000$ if lamp starting time $> 0,3s$
Starting time	$< 2,0s$	$< 1,5s$ if $P < 10W$ $< 1,0s$ if $P \geq 10W$
Lamp warm-up time to 60% $\Phi$	$< 40s$ or $< 100s$ for lamps containing mercury in amalgam form	$< 40s$ or $< 100s$ for lamps containing mercury in amalgam form
Premature failure rate	$\leq 5,0\%$ at 500 h	$\leq 5,0\%$ at 1000 h
Lamp power factor for lamps with integrated control gear	$\geq 0,50$ if $P < 25W$ $\geq 0,90$ if $P \geq 25W$	$\geq 0,55$ if $P < 25W$ $\geq 0,90$ if $P \geq 25W$
Colour rendering (Ra)	$\geq 80$ $\geq 65$ if the lamp is intended for outdoor or industrial applications according to point 3.1.3(I) of Annex III (EU Regulation 1194/2012)	$\geq 80$ $\geq 65$ if the lamp is intended for outdoor or industrial applications according to point 3.1.3(I) of Annex III (EU Regulation 1194/2012)

**LightingEurope note:** without the warning notice the lamp shall comply with the state-of-the-art requirement for compatibility with equipment designed for installation between the mains and the filament lamps from such time that a standard or other legally enforceable documents is published to explain these requirements.

**Table 5- Functionality requirements for directional incandescent and halogen lamps (derived from Table 3 of the EU Regulation)**

Functionality parameter	Stage 1 and 2	Stage 3
Rated lamp lifetime at 50% lamp survival	≥ 1000h (≥ 2000h in stage 2) ≥ 2000h for extra low voltage lamps not complying with the stage 3 filament lamp efficiency requirement in point 1.1 of Annex III (EU Regulation 1194/2012)	≥ 2000h ≥ 4000h for extra low voltage lamps
Lumen maintenance	≥ 80% at 75% of rated average lifetime	≥ 80% at 75% of rated average lifetime
Number of switching cycles	≥ four times the rated lamp life expressed in hours	≥ four times the rated lamp life expressed in hours
Starting time	< 0,2s	< 0,2s
Lamp warm-up time to 60% Φ	≤ 1,0s	≤ 1,0s
Premature failure rate	≤ 5,0% at 100h	≤ 5,0% at 200h
Lamp power factor for lamps with integrated control gear	Power > 25W: ≥ 0,9 Power ≤ 25 W: ≥ 0,5	Power > 25W: ≥ 0,9 Power ≤ 25 W: ≥ 0,5

#### 6.1.4 Lamp compatibility (for directional INC & HALO, CFLi and HID lamps)

- *“If the lamp cap is a standardised type also used with filament lamps, then as from 1<sup>st</sup> September 2014 (stage 2), the lamp shall comply with state-of-the-art requirements for compatibility with equipment designed for installation between the mains and filament lamps”.*

**LightingEurope note:** compatibility standards for lamps and equipment designed for installation between the mains and lamps are foreseen to become available in the future.

- Lamps which are claimed to be dimmable on specific dimmers must comply with the product information requirements (as detailed below in paragraph 6.1.5).
- Lamps which are not dimmable will be marked according to the lamps safety standards (e.g. EN 62560) with this symbol “*Dimming not allowed*”:



Figure 26 - Normative symbol "Dimming not allowed"

### **6.1.5 Product information requirements (for INC & HALO, CFLi and HID directional lamps)**

Filament lamps not fulfilling the efficacy requirements of Stage 2 and LED modules when marketed as part of a luminaire from which they are not intended to be removed by the end-user are exempted from the information requirements. As a consequence there are no product information requirements for luminaires.

The term 'energy-saving lamp' or any similar product related promotional statement about lamp efficacy may be used only if the energy efficiency index of the lamp is 0.40 or below.

#### **6.1.5.1 Information to be displayed on the lamp itself:**

- All lamps (other than high-intensity discharge lamps): power and voltage
- If there is sufficient space: value and unit (lm, K and C°) of the nominal useful luminous flux / colour temperature / nominal beam angle

#### **6.1.5.2 Information to be visibly displayed to end-users, prior to their purchase, on the packaging and on free access websites:**

For lamps/modules which are not intended to be sold to end-users the information below hasn't to be displayed on the packaging but shall be displayed on free access websites (e.g. HID lamps):

- nominal useful luminous flux displayed in a font at least twice as large as any display of the - nominal lamp power / nominal life time of the lamp / colour temperature;

- number of switching cycles before premature lamp failure / warm-up time up to 60 % of the full light output;
- a warning if the lamp cannot be dimmed or can be dimmed only on specific dimmers (only if the *lamp cap is NOT a standardised type also used with filament lamps*) / lamp dimensions / nominal beam angle in degrees;
- if the lamp's beam angle is  $\geq 90^\circ$  and its useful luminous flux as defined in point 1.1 of Annex III to EU Regulation 1194/2012 is to be measured in a  $120^\circ$  cone, a warning that the lamp is not suitable for accent lighting;
- if the lamp cap is a standardised type also used with filament lamps, but the lamp's dimensions are different from the dimensions of the filament lamp(s) that the lamp is meant to replace, a drawing comparing the lamp's dimensions to the dimensions of the filament lamp(s) it replaces.

If the lamp contains mercury:

- lamp mercury content as "x,x mg" / an indication of which website to consult in case of accidental lamp breakage to find instructions on how to clean up the lamp debris.

#### **6.1.5.3 Information to be made publicly available on free-access websites and in any other form the manufacturer deems appropriate:**

- rated power (0,1 w - precision) / starting time (as x,x seconds);
- rated luminous flux / rated beam angle / rated lamp life time / lamp power factor (not applicable for HID);
- lumen maintenance factor at the end of the nominal life;
- colour rendering / colour consistency (only LEDs) / Rated peak intensity in candela (cd);
- if intended for use in outdoor or industrial applications, an indication to this effect.

If the lamp contains mercury:

- recommendations on how to dispose of the lamp at the end of its life / Instructions on how to clean up the lamp debris in case of accidental lamp breakage.

**LightingEurope:** If lamps are claimed to be an alternative to existing types, they have to achieve the reference luminous flux from Table 6 below, corrected by the correction factors of following tables 7 and 8, and have a standardized lamp cap type according IEC 60061-1.

**Table 6 - Reference luminous flux for equivalence claims (derived from Table 6 of the EU Regulation)**

<b>Extra-low voltage reflector type</b>		
<b>Type</b>	<b>Power (W)</b>	<b>Reference <math>\Phi_{90^\circ}</math> (lm)</b>
MR11 GU4	20	160
	35	300
MR16 GU 5.3	20	180
	35	300
	50	540
AR111	35	250
	50	390
	75	640
	100	785
<b>Mains-voltage blown glass reflector type</b>		
<b>Type</b>	<b>Power (W)</b>	<b>Reference <math>\Phi_{90^\circ}</math> (lm)</b>
R50/NR50	25	90
	40	170
R63/NR63	40	180
	60	300
R80/NR80	60	300
	75	350
	100	580
R95/NR95	75	350
	100	540
R125	100	580
	150	1000
<b>Mains-voltage pressed glass reflector type</b>		
<b>Type</b>	<b>Power (W)</b>	<b>Reference <math>\Phi_{90^\circ}</math> (lm)</b>
PAR16	20	90
	25	125
	35	200
	50	300
PAR20	35	200
	50	300
	75	500
PAR25	50	350
	75	550
PAR30S	50	350
	75	550
	100	750
PAR36	50	350
	75	550
	100	720
PAR38	60	400
	75	555
	80	600
	100	760
	120	900



**Table 7 - Multiplication factors for lumen maintenance (derived from Table 7 of the EU Regulation)**

Lamp type	Luminous flux multiplication factor
Halogen lamps	1
Compact fluorescent lamps	1,08
LED lamps	$1 + 0,5 \times (1 - LLMF)$ where LLMF is the lumen maintenance factor at the end of the nominal life

**Table 8 - Multiplication factors for LED lamps (derived from Table 8 of the EU Regulation)**

LED lamp beam angle	Luminous flux multiplication factor
$20^\circ \leq \text{beam angle}$	1
$15^\circ \leq \text{beam angle} < 20^\circ$	0,9
$10^\circ \leq \text{beam angle} < 15^\circ$	0,85
beam angle $< 10^\circ$	0,80

**Special purpose products:**

For all special purpose products, the intended purpose shall be stated in all forms of product information, together with the warning that they are not intended for use in other applications.

### **6.1.6 Technical documentation file (for INC & HALO, CFLi and HID directional lamps)**

Before placing a product covered by implementing measures on the market, the manufacturer or its authorised representative shall ensure that an assessment of the product's conformity with all the relevant requirements of the applicable implementing measure is carried out.

The conformity assessment procedures shall be specified by the implementing measures and shall leave to manufacturers the choice between the internal design control set out in Annex IV of this ecodesign Directive and the management system set out in Annex V of this ecodesign Directive. Where duly justified and proportionate to the risk, the conformity assessment procedure shall be specified among relevant modules as described in Annex II to Decision No 768/2008/EC. Where a Member State has strong indications of probable noncompliance of a product, that Member State shall as soon as possible publish a substantiated assessment of the product's compliance which may be conducted by a competent body in order to allow, if appropriate, for timely corrective action. Where a product covered by implementing measures is designed by an organisation registered in accordance with Regulation (EC) No 761/2001 of the European Parliament and of the Council of 19 March 2001 allowing voluntary participation organisations in a Community eco-management and audit scheme (EMAS) ( 1 ) and the design function included within the scope of that registration, the management system of that organisation shall be presumed to comply with the requirements of Annex V to this Directive. If a product covered by implementing measures is designed by an organisation having a management system which includes the product design function and which is implemented in accordance with harmonised standards, the reference numbers of which have been published in the Official Journal of the European Union, that management system shall be presumed to comply with the corresponding requirements of Annex V.

After placing a product covered by implementing measures on the market and/or putting it into service, the manufacturer or its authorised representative shall keep relevant documents relating to the conformity assessment performed and declarations of conformity issued available for inspection by Member States for a period of 10 years after the last of that product has been manufactured. The relevant documents shall be made available within 10 days of receipt of a request by the competent authority of a Member State.

Documents relating to the conformity assessment and the EC declaration of conformity referred to in Article 5 shall be drawn up in one of the official languages of the institutions of the European Union.

### 6.1.7 Verification procedure for market surveillance purposes (for INC & HALO, CFLi and HID directional lamps)

Member States' authorities shall test a sample batch of a minimum of twenty lamps of the same model from the same manufacturer, where possible obtained in equal proportion from four randomly selected sources.

The model shall be considered to comply with the requirements laid down in this Regulation if:

- the lamps in the batch are accompanied by the required and correct product information
- the lamps in the batch are found to comply with the compatibility provisions of points 2.1 and 2.2 of Annex III (of the EU Regulation), applying state-of-the-art methods and criteria for assessing compatibility, including those set out in documents whose reference numbers have been published for that purpose in the Official Journal of the European Union
- testing of the parameters of the lamps in the batch listed in Table 9 shows no non-compliance for any of the parameters.

## 6.2 Ecodesign requirements for LED lamps and LED modules

In order to ensure consumer satisfaction with energy-saving lamps, LED lamps functionality requirements are set not only for directional lamps, but also to non-directional LEDs, as they were not covered by the functionality requirements in EC Regulation 244/2009.

**Table 9 - Overview on requirements for LED lamps (DIR & non-DIR)**

	<b>Definitions</b>	<b>Energy Efficiency Requirements</b>	<b>Functionality Requirements</b>	<b>Compatibility Requirements</b>	<b>Product Information Requirements</b>
<b>Directional</b> (T-) LED lamps and modules $\Phi_{use} < 80\% \Phi_{TOT}$ (120° cone)	EU Regulation 1194/2012, Article 2	EU Regulation 1194/2012, Annex III Art. 1.1	EU Regulation 1194/2012, Annex III Art. 2.2	EU Regulation 1194/2012, Annex III, Art.2.2; Annex III, Art 3.1 & 3.2	EU Regulation 1194/2012, Annex III Art.3.1; Annex III Art 3.2
<b>Non-Directional</b> (T-) LED lamps and modules $\Phi_{use} 80\% \geq \Phi_{TOT}$ (120° cone)	EC Regulation 244/2009, Article 2	EC Regulation 244/2009, Annex II, Article 1 (products for household illumination)	EU Regulation 1194/2012, Annex III Art. 2.2	EU Regulation 1194/2012, Annex III Art. 2.2; Annex III, Art 3.2	EU Regulation 1194/2012, Annex III, Art 3.2.  EC Regulation 244/2009, Annex II, Art. 3.1 (products for household illumination)

## 6.2.1 Energy Efficiency requirements

**LightingEurope note:** In the EU Regulation 1194/2012 energy efficiency requirements for directional LED lamps and modules are incorporated ( $\phi_{use} < 80\%$   $\phi_{TOT}$  in 120° cone). Energy efficiency requirements for non directional LED lamps and modules ( $\phi_{use} \geq 80\%$   $\phi_{TOT}$  in 120° cone) are incorporated in the EC Regulation 244/2009 (products for household illumination).

*“The energy efficiency requirements for directional LED lamps and modules is determined by the Energy Efficiency Index EEI:*

*The energy efficiency index (EEI) of the lamp is calculated as follows and rounded to two decimal places:*

$$EEI = P_{cor} / P_{ref}$$

*where:*

*P<sub>cor</sub> is the rated power measured at nominal input voltage and corrected where appropriate in accordance with Table 1. The correction factors are cumulative where appropriate”.*

**Table 10 - Correction factors (derived from Table 1 of the EU Regulation)**

Scope of the correction	Corrected power (P <sub>cor</sub> )
Lamps operating on external halogen lamp control gear	P <sub>rated</sub> x 1,06
Lamps operating on external LED lamp control gear	P <sub>rated</sub> x 1,10
Fluorescent lamps of 16 mm diameter (T5 lamps) and 4-pin single capped fluorescent lamps operating on external fluorescent lamp control gear	P <sub>rated</sub> x 1,10
Other lamps operating on external fluorescent lamp control gear	$P_{rated} \times \frac{0.24\sqrt{\Phi_{use}} + 0.0103\Phi_{use}}{0.15\sqrt{\Phi_{use}} + 0.0097\Phi_{use}}$
Lamps operating on external high-intensity discharge lamp control gear	P <sub>rated</sub> x 1.10
Compact fluorescent lamps with colour rendering index $\geq 90$	P <sub>rated</sub> x 0.85
Lamps with anti-glare shield	P <sub>rated</sub> x 0.80

**LightingEurope** understanding is that if the LED lamp can be operated by the direct mains, a power correction factor of 1 has to be used. If the LED lamp can only be operated with external control gear, the power correction factor of 1.1 has to be used or 1.06 in case of halogen control gear.

$P_{ref}$  is the reference power obtained from the useful luminous flux of the lamp ( $\Phi_{use}$ ) by the following formula:

For models with  $\Phi_{use} < 1300$  lumen:  $P_{ref} = 0.88\sqrt{\Phi_{use}} + 0.049\Phi_{use}$

For models with  $\Phi_{use} \geq 1300$  lumen:  $P_{ref} = 0.07341\Phi_{use}$

$\Phi_{use}$  is defined as follows:

Directional lamps with a beam angle  $\geq 90^\circ$  other than filament lamps and carrying a warning on their packaging in accordance with point 3.1.2(j) of Annex III of EU Regulation: rated luminous flux in a beam angle  $120^\circ$  ( $\Phi_{120^\circ}$ )

Other directional lamps: rated luminous flux in a beam angle of  $90^\circ$  ( $\Phi_{90^\circ}$ )

**Calculation method according to the draft new lamp energy labelling regulation**

**INPUT**    **Insert the data about the examined lamp in the yellow cells**

Useful luminous flux ( $\Phi_{use}$ , according to Table 3)

350 lumen

Rated Power ( $P_{rated}$ )

5,8 watt

External control gear

type "none" if no such gear, "halo" for halogen gear, "LED" for LED gear, "fluo" for fluorescent ballast, "HID" for HID ballast

none

**OUTPUT**    **Read the intermediate steps and the Energy Efficiency Index in the blue cells**

**Steps**

**1. Reference power ( $P_{ref}$ )**

If  $\Phi_{use} < 1300$  lumen :  $P_{ref} = 0.88\sqrt{\Phi_{use}} + 0.049\Phi_{use}$

If  $\Phi_{use} \geq 1300$  lumen :  $P_{ref} = 0.07341\Phi_{use}$

33,61 watt

**2. Power Correction Factor for external control gear (according to Table 2)**

1

**3. Corrected Power ( $P_{cor}$ )**

$P_{cor} = P_{rated} \times \text{Power Correction Factor}$

5,8 watt

**4. Energy Efficiency Index (EEI)**

$EEI = P_{cor} / P_{ref}$

0,17

Figure 27 - LightingEurope example: Lamp type PAR16; 5,8W (watt); 25° (degrees); 350 Lm (90° cone); no external control gear.

The maximum EEI of directional LED lamps and modules is indicated in Table 2 of the Regulation, in the column “**other lamps**”:

**Table 11 - Maximum energy efficiency index (EEI) for directional lamps (derived from the table 2 of the EU Regulation)**

Application date	Maximum energy efficiency index (EEI)			
	Mains-voltage filament lamps	Other filament lamps	High-intensity discharge lamps	Other lamps
<b>Stage 1 (1-9-2013)</b>	If $\Phi_{\text{use}} > 450 \text{ lm}$ : 1,75	If $\Phi_{\text{use}} \leq 450 \text{ lm}$ : 1,20 If $\Phi_{\text{use}} > 450 \text{ lm}$ : 0,95	0,50	0,50
<b>Stage 2 (1-9-2014)</b>	1,75	0,95	0,50	0,50
<b>Stage 3 (1-9-2016)</b>	0,95 <sup>2</sup>	0,95	0,36	0,20

## 6.2.2 Functionality requirements

The lamp functionality requirements are set out in Table 5 for both non-directional and directional LED lamps.

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<sup>2</sup> LightingEurope note: 0,95 Shall apply only when certain evidence is produced by the Commission no later than 30 September 2015.

**Table 12 - Functionality requirements for non-directional and directional LED lamps (derived from the table 5 of the EU Regulation)**

<b>Functionality parameter</b>	<b>Requirement as from stage 1, except where indicated otherwise</b>
Lamp survival factor at 6000h	From 1 March 2014: $\geq 0,90$
Lumen Maintenance at 6000h	From 1 March 2014: $\geq 0,80$
Number of switching cycles before failure	$\geq 15000$ if rated lamp life $\geq 30000$ h otherwise: $\geq$ half the rated lamp life expressed in hours
Starting time	$< 0,5$ s
Lamp warm-up time to 95% $\Phi$	$< 2$ s
Premature failure rate	$\leq 5,0\%$ at 1000h
Colour rendering (Ra)	$\geq 80$ $\geq 65$ if the lamp is intended for outdoor or industrial applications in accordance with point 3.1.3(l) of Annex III, EU Regulation 1194/2012
Colour consistency	Variation of chromaticity coordinates within a six-step MacAdam ellipse or less.
Lamp power factor (PF) for lamps with integrated control gear	$P \leq 2$ W : no requirement $2$ W $< P \leq 5$ W : PF $> 0,4$ $5$ W $< P \leq 25$ W : PF $> 0,5$ $P > 25$ W : PF $> 0,9$

**LightingEurope note:** without the warning notice the lamp shall comply with the state-of-the-art requirement for compatibility with equipment designed for installation between the mains and the filament lamps from such time that a standard or other legally enforceable documents is published to explain these requirements.

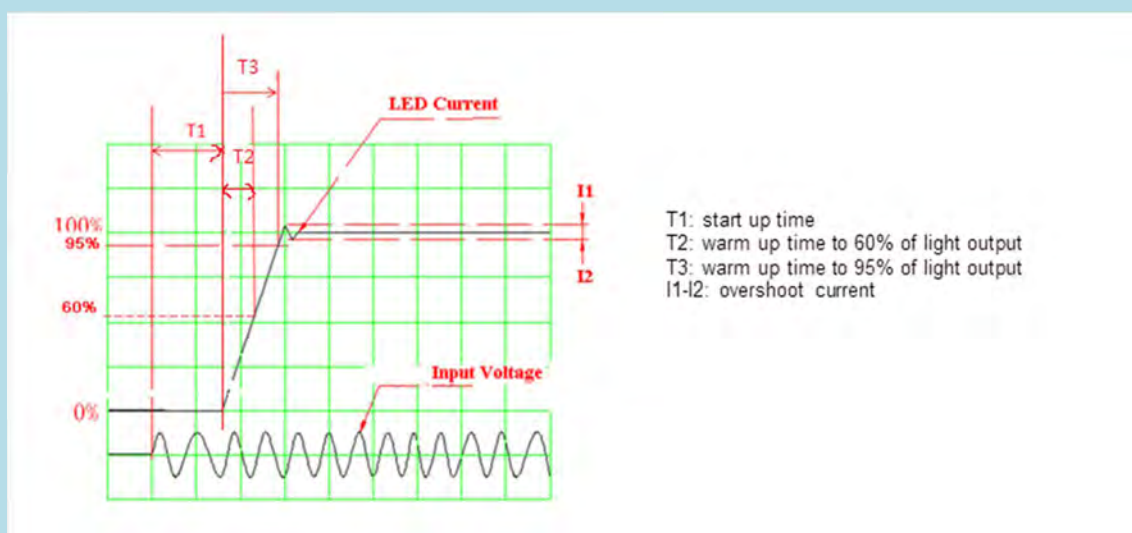
**LightingEurope note on testing conditions:** Relevant IEC/PAS documents (like IEC/PAS 62612/62717/62722-1/2) are the reference for standards and measurements methods related to EC Regulation 1194/2012. Alternative test methods as robust /effective can be applicable, for example table 2 (EN 60081, Annex D2) is generally covered by ANSI C78.377. IEC/PAS documents will be superseded by EN standards in the future.

**LightingEurope note on switching cycles:** EC Regulation 1194/2012 does not specify the testing conditions for switching cycles. Up to date standards and test methods are to be applied in this case IEC/PAS 62612 or 62717 stating 30 sec on, 30 sec off.

**LightingEurope note on color point:** color points as mentioned in IEC documents are not mandatory. They differ for instance from ANSI. As they are not mandatory, the manufacturer shall designate the central color point (x-y coordinates) used including the measurement method (eg ANSI, IEC) and publish these in the documentation & website. For verification the average delta SCDM (MacAdam ellipses) from 20 lamps should be within 6 SDCM.

**LightingEurope note on starting time & Lamp warm up time:** Below graph explains T1 start up time, T2 60% warm up time and T3 95% warm up time as function of electrical input current into the LED chip.

For LED modules which require additional external control gear, a fixed power supply is to be used which has been adjusted to the prescribed input power requirement in the technical documentation of the module.



**LightingEurope note on power factor:** verification procedure for power factor is described in Annex IV (of the EU Regulation), table 9 “other parameters”.



### 6.2.3 Lamp compatibility

If the lamp cap is a standardised type also used with filament lamps, then as from stage 2 the lamp shall comply with state-of-the-art requirements for compatibility with equipment designed for installation between the mains and filament lamps.

Lamps which are claimed to be dimmable must comply with the product information requirements as detailed in Article 6.2.4.2.

Lamps which are not claimed to be dimmable have no compatibility requirements related to dimmers. There are lamp safety standards (e.g. IEC 62560; Ed.1) that require information about non dimmability of a lamp with this symbol “*Dimming not allowed*”.



Figure 28 - Normative symbol “Dimming not allowed”

### 6.2.4 Product information requirements (only directional lamps and modules)

The following information shall be provided as from stage 1, except where otherwise stipulated.

These information requirements do not apply to:

- filament lamps not fulfilling the efficacy requirements of Stage 2 (1-09-2014);
- LED modules when marketed as part of a luminaire from which they are not intended to be removed by the end-user.

**LightingEurope note:** Directional lamps which do not comply with the energy efficiency requirements per 1-09-2013 and / or 1-09-2014 do not need to comply with the product information requirements.

LED modules which are not sold via a point of sale directly to end users, do not have to comply with the product information requirements.

In all forms of product information, the term 'energy-saving lamp' or any similar product related promotional statement about lamp efficacy may be used only if the energy efficiency index of the lamp (calculated in accordance with the method set out in point 8.1.4.1) is 0,40 or below.

#### **6.2.4.1 Information to be displayed on the lamp itself**

For lamps other than high-intensity discharge lamps, the value and unit ('lm', 'K' and '°') of the nominal useful luminous flux, of the colour temperature and of the nominal beam angle shall be displayed in a legible font on the surface of the lamp if, after the inclusion of safety-related information such as power and voltage, there is sufficient space available for it on the lamp without unduly obstructing the light coming from the lamp.

If there is room for only one of the three values, the nominal useful luminous flux shall be provided. If there is room for two values, the nominal useful luminous flux and the colour temperature shall be provided.

#### **6.2.4.2 Information to be visibly displayed to end-users, prior to their purchase, on the packaging and on free access websites**

The information in paragraphs (a) to (o) below shall be displayed on free access websites and in any other form the manufacturer deems appropriate.

If the product is placed on the market in a packaging containing information to be visibly displayed to the end-users, prior to their purchase, the information shall also be clearly and prominently indicated on the packaging.

The information does not need to use the exact wording on the list below. It may be displayed in the form of graphs, drawings or symbols rather than text.

- (a) Nominal useful luminous flux displayed in a font at least twice as large as any display of the nominal lamp power;
- (b) Nominal life time of the lamp in hours (not longer than the rated life time);
- (c) Colour temperature, as a value in Kelvins and also expressed graphically or in words;
- (d) Number of switching cycles before premature failure;
- (e) Warm-up time up to 60 % of the full light output (may be indicated as 'instant full light' if less than 1 second);

- (f) A warning if the lamp cannot be dimmed or can be dimmed only on specific dimmers; in the latter case a list of compatible dimmers shall be also provided on the manufacturer's website;
- (g) If designed for optimum use in non-standard conditions (such as ambient temperature  $T_a \neq 25^\circ\text{C}$  or specific thermal management is necessary), information on those conditions;
- (h) Lamp dimensions in millimetres (length and largest diameter);
- (i) Nominal beam angle in degrees;
- (j) If the lamp's beam angle is  $\geq 90^\circ$  and its useful luminous flux as defined in point 1.1 of Annex III (EU Regulation 1194/2012) is to be measured in a  $120^\circ$  cone, a warning that the lamp is not suitable for accent lighting;
- (k) If the lamp cap is a standardised type also used with filament lamps, but the lamp's dimensions are different from the dimensions of the filament lamp(s) that the lamp is meant to replace, a drawing comparing the lamp's dimensions to the dimensions of the filament lamp(s) it replaces;
- (l) An indication that the lamp is of a type listed in the first column of Table 6 may be displayed only if the luminous flux of the lamp in a  $90^\circ$  cone ( $\Phi 90^\circ$ ) is not lower than the reference luminous flux indicated in Table 6 for the smallest wattage among the lamps of the type concerned. The reference luminous flux shall be multiplied by the correction factor in Table 7. For LED lamps, it shall be in addition multiplied by the correction factor in Table 8;
- (m) An equivalence claim involving the power of a replaced lamp type may be displayed only if the lamp type is listed in Table 6 and if the luminous flux of the lamp in a  $90^\circ$  cone ( $\Phi 90^\circ$ ) is not lower than the corresponding reference luminous flux in Table 6. The reference luminous flux shall be multiplied by the correction factor in Table 7. For LED lamps, it shall be in addition multiplied by the correction factor in Table 8. The intermediate values of both the luminous flux and the claimed equivalent lamp power (rounded to the nearest 1 W) shall be calculated by linear interpolation between the two adjacent values.

**LightingEurope note:** An indication that the lamp is of a type listed in the first column of table 6 may be displayed only if the luminous flux of the lamp in a 90° cone ( $\Phi 90^\circ$ ) is not lower than the reference luminous flux indicated in Table 6 for the smallest wattage among the lamps of the type concerned.

Intermediate values should be obtained by interpolation and values exceeding the highest value in the table, by linear extrapolation. Lower values than defined in table 6 can not be used for equivalency references.

**LightingEurope note:** The regulation indicates the luminous flux of the lamp in a 90 degree cone to be not lower than the corresponding luminous flux in table 6. So this is a one sided tolerance: you may deliver more lumens but not less! Example: a MR16 watt lamp providing 400 lumen can still be claimed a 35 watt equivalent (35W requires a minimum of 300 lumens).

**LightingEurope note:** equivalency wattage indications on the packaging shall be printed close to the equivalency/replacement lamp type indication. Equivalency can be claimed even when the lamp dimensions are not fully within IEC defined outlines as long as the difference is clarified in a diagram on the packaging.

If the product can not fully meet the outline of IEC, than the packing shall indicate where the difference is comparing to official IEC outline. For non-directional lamps, it is necessary to indicate the diameter and lengths of the lamp, but no need to point out the differences with the official IEC outlines.

If the product intends to follow the dimensions of a e.g. Par16, just an equivalency claim to GU10 is acceptable. If it intends to replace a Par20, the product shall refer to Par20 on the packaging as well.

If the equivalent product refers to a lamp diameter, this diameter should not be exceeded by the LED product (eg. MR16).

Any equivalency claim is only valid if the more energy efficient alternative has the same (standardized) socket as the lamp mentioned in the table 7 of the EU Regulation 1194/2012.

**Table 13 - Reference luminous flux for equivalence claims (derived from Table 6 of the EU Regulation)**

<b>Extra-low voltage reflector type</b>		
<b>Type</b>	<b>Power (W)</b>	<b>Reference <math>\Phi_{90^\circ}</math> (lm)</b>
MR11 GU4	20	160
	35	300
MR16 GU 5.3	20	180
	35	300
	50	540
AR111	35	250
	50	390
	75	640
	100	785
<b>Mains-voltage blown glass reflector type</b>		
<b>Type</b>	<b>Power (W)</b>	<b>Reference <math>\Phi_{90^\circ}</math> (lm)</b>
R50/NR50	25	90
	40	170
R63/NR63	40	180
	60	300
R80/NR80	60	300
	75	350
	100	580
R95/NR95	75	350
	100	540
R125	100	580
	150	1000
<b>Mains-voltage pressed glass reflector type</b>		
<b>Type</b>	<b>Power (W)</b>	<b>Reference <math>\Phi_{90^\circ}</math> (lm)</b>
PAR16	20	90
	25	125
	35	200
	50	300
PAR20	35	200
	50	300
	75	500
PAR25	50	350
	75	550
PAR30S	50	350
	75	550
	100	750
PAR36	50	350
	75	550
	100	720
PAR38	60	400
	75	555
	80	600
	100	760
	120	900

**LightingEurope Note:** The values in the above Table 13 are valid for lamps with different lamp caps. Like values for PAR16 are valid for E14, as well as GU10 lamp caps.

**Table 14 - Multiplication factors for lumen maintenance (derived from Table 7 of the EU Regulation)**

Lamp type	Luminous flux multiplication factor
Halogen lamps	1
Compact fluorescent lamps	1,08
LED lamps	$1 + 0,5 \times (1 - LLMF)$ where LLMF is the lumen maintenance factor at the end of the nominal life

**LightingEurope note:** Definitions of LLMF and lifetime (EU Regulation, ANNEX II (j) and (l)) define lifetime at  $L_{70}B_{50}$ . Meaning a 30% lumen depreciation is to be calculated for. Leading to a constant LLMF factor of 1,15 for LED

**Table 15 - Multiplication factors for LED lamps (derived from Table 8 of the EU Regulation)**

LED lamp beam angle	Luminous flux multiplication factor
$20^\circ \leq \text{beam angle}$	1
$15^\circ \leq \text{beam angle} < 20^\circ$	0,9
$10^\circ \leq \text{beam angle} < 15^\circ$	0,85
beam angle $< 10^\circ$	0,80

### LightingEurope Example:

Lamp type PAR16; 5,8W;25D°;350 Lm (90°cone); no external control gear.

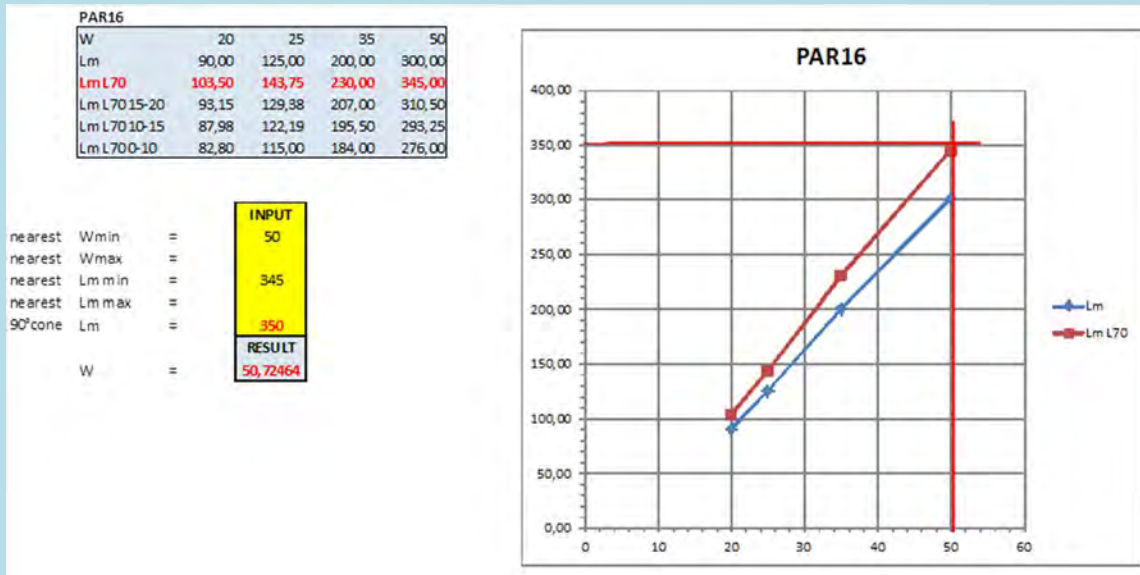


Figure 29

If the lamp contains mercury:

- (n) Lamp mercury content as X,X mg;
- (o) Indication of which website to consult in case of accidental lamp breakage to find instructions on how to clean up the lamp debris.

#### 6.2.4.3 Information to be made publicly available on free-access websites and in any other form the manufacturer deems appropriate

As a minimum, the following information shall be expressed at least as values.

- (a) The information specified in point 3.1.2;
- (b) Rated power (0,1 W precision);
- (c) Rated useful luminous flux;
- (d) Rated lamp life time;

- (e) Lamp power factor;
- (f) Lumen maintenance factor at the end of the nominal life (except for filament lamps);
- (g) Starting time (as X,X seconds);
- (h) Colour rendering;
- (i) Colour consistency (only for LEDs);
- (j) Rated peak intensity in candela (cd);
- (k) Rated beam angle;
- (l) If intended for use in outdoor or industrial applications, an indication to this effect;
- (m) Spectral power distribution in the range 180-800 nm;

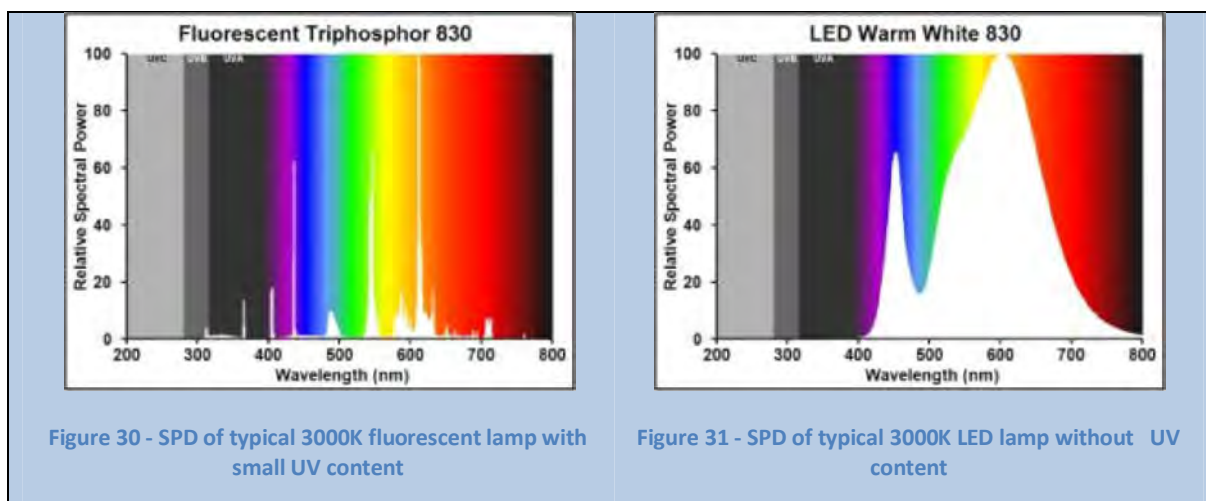
**LightingEurope note:** The regulation indicates that the spectral power distribution (SPD) of the lamp shall be made available in the range 180-800nm. It would be favourable to provide the spectral information graphically rather than as a list of numerical values. Preferably this would be in the form of a bar chart with wavelength on the x-axis and the spectral power being on the y-axis with a linear and relative scale. A relative scale is desirable to avoid the requirement to produce numerous separate charts for lamps which have identical spectral power distribution but different luminous flux, and would therefore require different labelling on the y-axis for every individual product.

Furthermore the regulation indicates that ultra-violet data should be provided to 180nm. Measurement at such short wavelengths is technically General lighting lamps are designed to reduce ultra-violet radiation to a level that no ultra-violet hazard is expected for the intended use.

After discussion, one of whose stakeholders had originally proposed the provision of data down to 180nm, it was concluded that in fact information over the range 200-800nm would be satisfactory.

Some examples of how the data might be presented for two common household lamps, one having a small UV component and the other not, is illustrated below. We consider that the clear visual differentiation should be sufficient and effective to guide consumers who have concerns about short wavelength radiation to make an informed decision as to which model they wish to purchase.





If the lamp contains mercury:

- (n) Instructions on how to clean up the lamp debris in case of accidental lamp breakage;
- (o) Recommendations on how to dispose of the lamp at the end of its life for recycling in line with EU Directive 2012/19 (see OJ L 197, 24.7.2012, p. 38).

#### 6.2.4.4 Additional product information requirements for LED lamps replacing fluorescent lamps without integrated ballast

In addition to the product information requirements according to point 3.1 of Annex III to EU Regulation 1194/2012 or point 3.1 of Annex II to EC Regulation 244/2009, as from stage 1, manufacturers of LED lamps replacing fluorescent lamps without integrated ballast shall publish a warning on publicly available free-access websites and in any other form they deem appropriate that the overall energy efficiency and light distribution of any installation that uses such lamps are determined by the design of the installation.

Claims that an LED lamp replaces a fluorescent lamp without integrated ballast of a particular wattage may be made only if:

- a) the luminous intensity in any direction around the tube axis does not deviate by more than 25 % from the average luminous intensity around the tube, and
- b) the luminous flux of the LED lamp is not lower than the luminous flux of the fluorescent lamp of the claimed wattage. The luminous flux of the fluorescent lamp shall be obtained by multiplying the claimed wattage with

the minimum luminous efficacy value corresponding to the fluorescent lamp in Commission Regulation 245/2009, and

- c) the wattage of the LED lamp is not higher than the wattage of the fluorescent lamp it is claimed to replace.

The technical documentation file shall provide the data to support such claims.

### **6.2.5 Verification procedure for market surveillance purposes**

When performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC, the Member States' authorities shall apply the verification procedures listed in Annex IV to EU Regulation 1194/2012. The market surveillance authorities shall provide the information of the testing results to other Member States and to the Commission.

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.

### **6.2.6 Verification procedure for lamps other than LED lamps and for LED lamps that are meant to be replaced in the luminaire by the end-user**

Member States' authorities shall test a sample batch of a minimum of twenty lamps of the same model from the same manufacturer, where possible obtained in equal proportion from four randomly selected sources, unless specified otherwise in Table 9.

The model shall be considered to comply with the requirements laid down in this Regulation if:

- a) the lamps in the batch are accompanied by the required and correct product information, and
- b) the lamps in the batch are found to comply with the compatibility provisions of points 2.1 and 2.2 of Annex III (of the EU Regulation), applying state-of-the-art methods and criteria for assessing compatibility, including those set out in documents whose reference numbers have been published for that purpose in the Official Journal of the European Union, and

- c) testing of the parameters of the lamps in the batch listed in Table 9 shows no non-compliance for any of the parameters.

**Table 16 - Compliance for any of the parameters (derived from Table 9 of the EU Regulation)**

<b>Parameter</b>	<b>Procedure</b>
Lamp survival factor at 6000h (for LED lamps only)	<p>The test shall end</p> <ul style="list-style-type: none"> <li>• when the required number of hours is met, or</li> <li>• when more than two lamps fail, whichever occurs first.</li> </ul> <p>Compliance: a maximum of two out of every 20 lamps in the test batch may fail before the required number of hours. Non-compliance: otherwise.</p>
Number of switching cycles before failure	<p>The test shall end when the required number of switching cycles is reached, or when more than one out of every 20 lamps in the test batch have reached the end of their life, whichever occurs first.</p> <p>Compliance: at least 19 of every 20 lamps in the batch have no failure after the required number of switching cycles is reached. Non-compliance: otherwise.</p>
Starting time	<p>Compliance: the average starting time of the lamps in the test batch is not higher than the required starting time plus 10%, and no lamp in the sample batch has a starting time longer than two times the required starting time. Non-compliance: otherwise.</p>
Lamp warm-up time to 60 % $\Phi$	<p>Compliance: the average warm-up time of the lamps in the test batch is not higher than the required warm-up time plus 10%, and no lamp in the sample batch has a warm-up time that exceeds the required warm-up time multiplied by 1.5. Non-compliance: otherwise.</p>
Premature failure rate	<p>The test shall end</p> <ul style="list-style-type: none"> <li>• when the required number of hours is met, or</li> <li>• when more than one lamp fails, whichever occurs first.</li> </ul> <p>Compliance: a maximum of one out of every 20 lamps in the test batch fails before the required number of hours. Non-compliance: otherwise.</p>

<b>Parameter</b>	<b>Procedure</b>
Colour rendering (Ra)	<p>Compliance: the average Ra of the lamps in the test batch is not lower than three points below the required value, and no lamp in the test batch has a Ra value that is more than 3.9 points below the required value.</p> <p>Non-compliance: otherwise.</p>
Lumen maintenance at end of life and rated lifetime (for LED lamps only)	<p>For these purposes, 'end of life' shall mean the point in time when only 50% of the lamps are projected to survive or when the average lumen maintenance of the batch is projected to fall below 70%, whichever is projected to occur first.</p> <p>Compliance: the lumen maintenance at end of life and the lifetime values obtained by extrapolation from the lamp survival factor and from the average lumen maintenance of the lamps in the test batch at 6000h are not lower than respectively the lumen maintenance and the rated lifetime values declared in the product information minus 10%.</p> <p>Non-compliance: otherwise.</p>
Equivalence claims for retrofit lamps according to points 3.1.2(l) and (m) of Annex III (of the EU Regulation)	<p>If only the equivalence claim is verified for compliance, it is sufficient to test 10 lamps, where possible obtained approximately in equal proportion from four randomly selected sources.</p> <p>Compliance: the average results of the lamps in the test batch do not vary from the limit, threshold or declared values by more than 10%.</p> <p>Non-compliance: otherwise.</p>
Beam angle	<p>Compliance: the average results of the lamps in the test batch do not vary from the declared beam angle by more than 25% and the beam angle value of each individual lamp in the test batch does not deviate by more than 25% of the rated value.</p> <p>Non-compliance: otherwise.</p>
Peak intensity	<p>Compliance: the peak intensity of each individual lamp in the test batch is not less than 75% of the rated intensity of the model.</p> <p>Non-compliance: otherwise.</p>

Parameter	Procedure
Other parameters (including the energy efficiency index)	Compliance: the average results of the lamps in the test batch do not vary from the limit, threshold or declared values by more than 10%. Non-compliance: otherwise.

Otherwise, the model shall be considered not to comply.

**LightingEurope note:** All parameters related to EU Regulation 1194/2012, which are claimed on artwork, website or any other form of documentation by the manufacturer, shall be verified according to ANNEX III (of the EU Regulation), table 9. If the relevant parameter is not specifically mentioned in table 9, verification shall take place according to the description under “other parameters”.

## 6.2.7 Verification procedure for LED modules not intended to be removed from the luminaire by the end-user

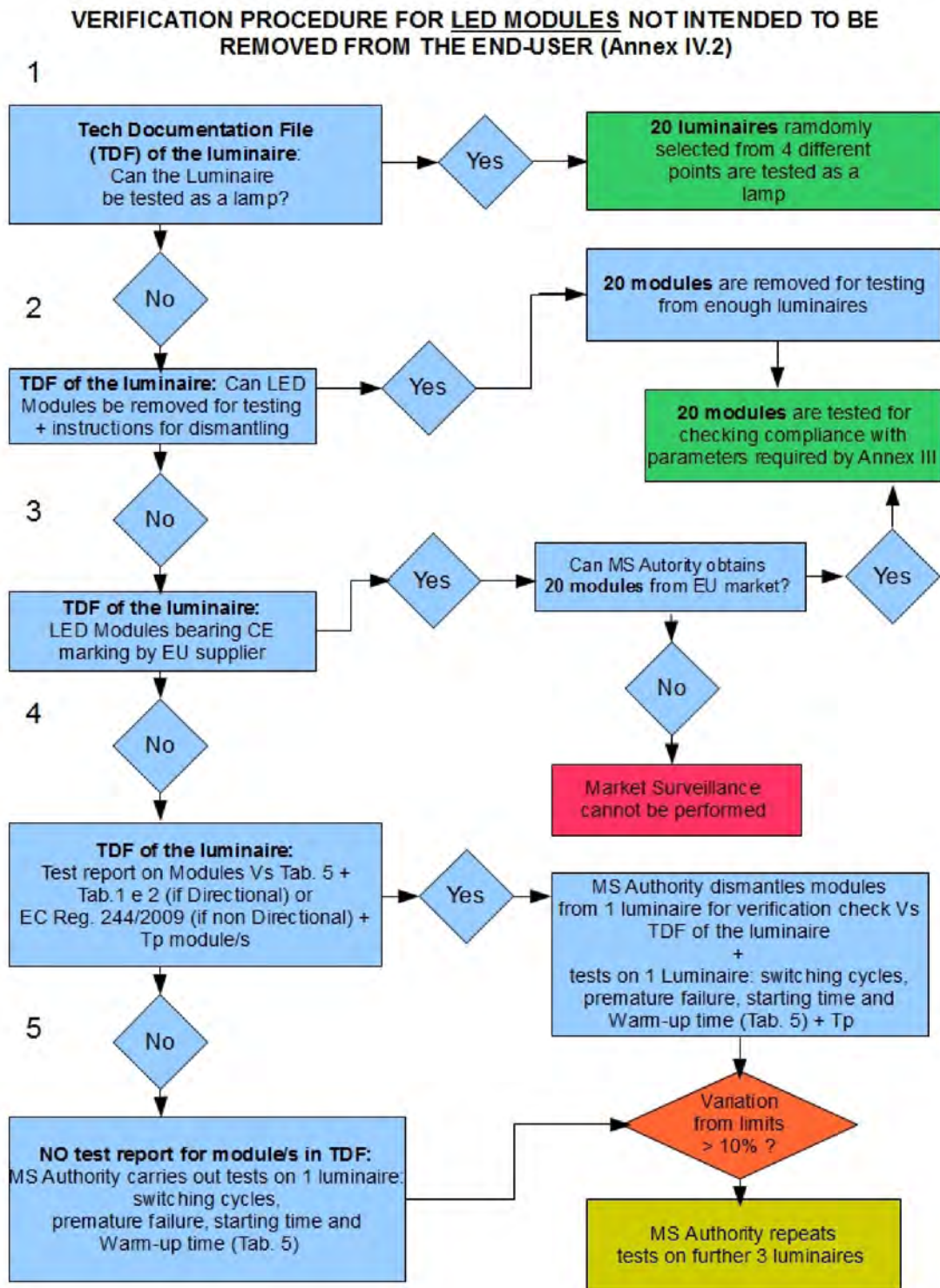


Figure 32 - Flow-chart on procedure concerning market surveillance for non-replaceable end-user LED modules and lamps

For the purposes of the tests described below, Member States' authorities shall obtain test units of the same model from the same manufacturer (of LED modules or luminaires, as applicable), where possible in equal proportion from randomly selected sources. For points (1), (3) and (5) below, the number of sources shall be at least four where possible. For point (2), the number of sources shall be at least four where possible, unless the number of luminaires necessary to obtain by extraction 20 LED modules of the same model is less than four, in which case the number of sources is equal to the number of luminaires needed. For point (4), if the test on the first two luminaires fails, the next three to be tested shall come from three other sources where possible.

Member States' authorities shall apply the following procedure in the order given below, until a conclusion regarding the compliance of model(s) of the LED module(s) is reached, or they conclude that testing cannot be performed. "Luminaire" refers to the luminaire containing the LED modules, and "test" refers to the procedure described in part 1 of Annex IV to EU Regulation 1194/2012, except in point (4). If testing according to both points (1) and (2) is allowed in the technical documentation file, the authorities may choose the most appropriate method.

- (1) If the technical documentation file of the luminaire provides for testing the whole luminaire as a lamp, the authorities shall test 20 luminaires as lamps. If the model of the luminaire is considered to comply, the model(s) of the LED module(s) shall be considered to comply with the requirements laid down in this Regulation. If the model of the luminaire is considered not to comply, the model(s) of the LED module(s) shall be considered not to comply either.
- (2) Otherwise, if the technical documentation file of the luminaire allows for the removal of the LED module(s) for testing, the authorities shall obtain enough luminaires to obtain 20 copies of each incorporated LED module model. They shall follow the instructions of the technical documentation file to dismantle the luminaires and test each LED module model separately. The conclusion regarding the compliance of the model(s) of the LED module(s) shall follow from the test(s).
- (3) Otherwise, if according to the technical documentation file of the luminaire, the luminaire manufacturer obtained the incorporated LED module(s) as individual CE marked product(s) from the Union market, the authorities shall obtain 20 copies of each LED module model from the Union market for testing and test each LED module model separately. The conclusion regarding the compliance of the model(s) of the LED module(s) shall follow from the test(s). If the model(s) are not available any more on the Union market, market surveillance cannot be performed.

- (4) Otherwise, if the luminaire manufacturer did not obtain the incorporated LED module(s) as individual CE marked products from the Union market, the authorities shall request the luminaire manufacturer to deliver a copy of the original test data of the LED module(s) showing that the LED module(s) comply with the requirements applicable to:
- all LED modules in Table 5 of this Regulation;
  - if they are directional LED modules, in Tables 1 and 2 of this Regulation;
  - if they are non-directional LED modules, in Tables 1, 2 and 3 of Commission Regulation 244/2009.

If according to the test data, any of the LED module model(s) in the luminaire do not comply with the requirements, the model(s) of the LED module(s) shall be considered not to comply.

Otherwise, the authorities shall dismantle a single luminaire to check that the LED module(s) in the luminaire are the same type as described in the test data. If any of them is different or cannot be identified, the model(s) of the LED module(s) shall be considered not to comply.

Otherwise, the switching cycles, premature failure, starting time and warm-up time requirements of Table 5 shall be tested on another luminaire operated at its rating. During operation of the luminaire at its rated values, the temperature of the LED module(s) shall be also tested against the defined limits. If the results of the tests (other than on premature failure) vary from the limit values by more than 10%, or the luminaire failed prematurely, three more luminaires shall be tested. If the averages of the results of the subsequent three tests (other than those relating to premature failure and to operating temperature) do not vary from the limit values by more than 10%, none of the luminaires failed prematurely, and the operating temperature (in °C) is within 10% of the defined limits in all three of them, the model(s) of the LED module(s) shall be considered to comply with the requirements. Otherwise, they shall be considered not to comply.

- (5) If testing according to points (1) to (4) is not possible because no independently testable LED modules can be distinguished in the luminaire, the authorities shall test the switching cycles, premature failure, starting time and warm-up time requirements of Table 5 on a single luminaire. If the results of the tests vary from the limit values by more than 10%, or the luminaire failed prematurely, three more luminaires shall be tested. If the averages of the results of the subsequent three tests (other than those relating to premature failure) do not vary from the limit values by more than 10%, and none of the



luminaires failed prematurely, the model(s) of the LED module(s) incorporated into the luminaire shall be considered to comply with the requirements laid down in this Regulation. Otherwise, they shall be considered not to comply.

## **7 Requirements and verification procedures for the equipment between the mains and the lamps (Annex III and Annex IV of the EU Regulation 1194/2012)<sup>3</sup>**

### **7.1 Halogen lamp control gear (transformers, ballasts, switches, etc)**

#### **7.1.1 EcoDesign requirements**

##### **7.1.1.1 Energy Efficiency requirements**

Energy efficiency requirements for halogen lamp control gears are stated in Annex III (of the EU Regulation), point 1.2:

*“As from stage 2, the no-load power of a lamp control gear intended for use between the mains and the switch for turning the lamp load on/off shall not exceed 1,0 W. As from stage 3, the limit shall be 0,50 W. For lamp control gear with output power (P) over 250 W, the no-load power limits shall be multiplied by P/250 W.*

*As from stage 3, the standby power of a lamp control gear shall not exceed 0,50 W.*

*As from stage 2, the efficiency of a halogen lamp control gear shall be at least 0,91 at 100 % load”.*

Most halogen lamp control gear in the market today are physically one unit, a transformer with 50 Hz extra low voltage output, convertor with extra low voltage high frequency or direct current output. Should the function of the control gear be realized in more than one unit, according to the definition of the control gear, these units are considered different control gear and the requirements are applied to each separate control gear.

If the switch intended for normal switching light on and off is between the lamp and the control gear (secondary or output side of the control gear) the requirements for no-load and standby power apply. If the switch is only on the primary or input side these requirements do not apply.

No-load condition is defined in Annex II (of the EU Regulation), definition (s). According to the definition the no-load power requirement applies to normal operation. So it does not apply e.g. when the lamp has become faulty or the lamp is switched off by e.g. safety switch due to overheating even when this switch is on the secondary side.

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<sup>3</sup> Chapter 7 is under revision and it will be updated when issuing Version 2 of the present Guide.

Standby mode is defined in the definition (t) of Annex II of the Regulation. Standby power limit 0,5 W will enter into force from stage 3.

The efficiency means the ratio of the output power to input power of the controlgear at the rated 100% load of the control gear. This limit value seems to phase out transformer type halogen controlgear with small rated power. High power transformers may meet the efficiency requirement but may be used only with switch on the primary side as they may not meet the no-load / standby requirements.

#### **7.1.1.2 Functionality requirements**

In Annex III point 2.3 (of the EU Regulation), functionality requirements are given concerning control devices:

*When a dimming control device is switched on at its lowest control setting for which the operated lamps consume power, the operated lamps shall emit at least 1 % of their luminous flux at full load.*

It may be assumed that this requirement covers dimmable control gear and its dimming control device. The intention of this requirement is that the user notices when the difference between operation at minimum light output and when the lights are totally switched off. This is to ensure that the lights are not let on at the minimum level unintentionally to avoid the unnecessary standby power consumption.

#### **7.1.1.3 Lamp compatibility**

Lamp compatibility requirement is given in Annex III (of the EU Regulation), point 2.3:

*“As from stage 2, equipment designed for installation between the mains and the lamps shall comply with state-of-the-art requirements for compatibility with lamps whose energy efficiency index (calculated for both directional and non-directional lamps in accordance with the method set out in point 1.1 of this Annex) is at most:*

- 0,24 for non-directional lamps (assuming that  $\Phi_{use}$  = total rated luminous flux),*
- 0,40 for directional lamps.”*

This requirement is not required if a warning notice is provided with the halogen lamp control gear, see next point.

“State-of-the-art requirements for compatibility” is not defined in the regulation. This is expected to be defined in the standards to be published later. “Compatibility” is specified in the definition (aa) of Annex II of the Regulation:

*“compatibility’ means that when a product is intended to be installed in an installation, inserted into another product or connected to it through physical contact or wireless connection,*

*(i) it is possible to perform the installation, insertion or connection; and*

*(ii) shortly after starting to use them together, end-users are not led to believe that any of the products has a defect; and*

*(iii) the safety risk of using the products together is not higher than when the same products taken individually are used in combination with other products”.*

Without the warning notice the control gear shall comply with the state-of-the-art requirement for compatibility with the lamps having maximum energy efficiency index as defined above (minimum class A lamps). The control gear shall only have to comply with state-of-the-art requirements from such time that a standard or other legally enforceable documents is published to explain these requirements. This is challenging as the control gear manufacturer is supposed to know all the current and future lamp technologies to ensure the required compatibility with these lamps. As the current control gears on the market typically has a minimum load power requirement (typically in the range 15...25% of the rated power) in order to operate properly, the compatibility does not exist for very low power loads e.g. when halogen lamps are replaced by low power LED lamps. This is the case where a warning notice is needed.

#### **7.1.1.4 Product information requirements**

Product information requirements given in Annex III point 3.3 (of the EU Regulation) apply also to halogen lamp controlgear:

*“As from stage 2, if the equipment provides no compatibility with any of the energy-saving lamps according to part 2.3 of this Annex, a warning that the equipment is not compatible with energy-saving lamps shall be published on publicly available free-access websites and in other forms the manufacturer deems appropriate”.*

This is interpreted so that the compatibility requirements are not required if the warning notice is provided.

In Annex III point 3.4 of the EU Regulation 1194/2012 there are particular requirements for lamp controlgears:

As from stage 2, the following information shall be published on publicly available free access websites and in other forms the manufacturer deems appropriate:

- Indication that the product is intended to be used as a lamp control gear,
- If applicable, the information that the product may be operated in no-load mode.

The first requirement is needed to differentiate converters and transformers which are intended for other purpose from those intended for lighting. This regulation is applicable to the products intended for lighting. These products are recognized by this information.

The second requirement is needed to differentiate the products intended for no-load operation from those which only allow the switch on the primary (input) side and are not intended for no-load operation.

### **7.1.2 Verification procedure for market surveillance purposes**

The verification procedure for equipment designed for installation between the mains and the lamps given in clause 3 of Annex IV of the Regulation is applicable to halogen control gears:

*Member State authorities shall test one single unit.*

*The equipment shall be considered to comply with the requirements laid down in this Regulation if it is found to comply with the compatibility provisions of point 2.3 of Annex III, applying state-of-the-art methods and criteria for assessing compatibility, including those set out in documents whose reference numbers have been published for that purpose in the Official Journal of the European Union. If non-compatibility is concluded, the model shall still be considered to comply if it fulfils the product information requirements in point 3.3 of Annex III or in Article 3.2 of Delegated Regulation (EU) No 874/2012.*

*In addition to the compatibility requirements, lamp control gear shall also be tested for the efficiency requirements in point 1.2 of Annex III. The test shall be carried out on a single piece of lamp control gear, not on a combination of several pieces of lamp control gear, even if the model is designed to rely on other pieces of lamp control gear to operate the lamp(s) in a given installation. The model shall be considered to comply with the requirements if the results do not vary from the limit values by more than 2,5 %. If the results vary from the limit values by more than 2,5 %, three more units shall be tested.*

*The model shall be considered to comply with the requirements if the average of the results of the subsequent three tests does not vary from the limit values by more than 2,5 %.*

*In addition to the compatibility requirements, luminaires intended to be marketed to end-users shall also be checked for the presence of lamps in their packaging. The model shall be considered to comply if no lamps are present or if the lamps that are present are of the energy classes required in point 2.3 of Annex III.*

*In addition to the compatibility requirements, dimming control devices shall be tested with filament lamps when the control device is in the minimum dimming position. The model shall be considered to comply if, when installed according to the manufacturer's instructions, the lamps provide at least 1 % of their luminous flux at full load.*

*If the model does not fulfil the applicable compliance criteria referred to above, it shall be considered not to comply.*

**LightingEurope note:**

- State-of –the art methods and criteria is not defined in this regulation. The methods and criteria will be defined in the referred documents (standards), whose names will be published in the Official Journal of the European Union.
- Compatibility is not required if the warning notice is provided according to clause 3.3.

## **7.2 LED lamp control gear**

### **7.2.1 EcoDesign requirements**

#### **7.2.1.1 Energy Efficiency requirements**

Energy efficiency requirements for LED lamp control gears are same as for halogen lamp control gears (see 7.1.4.2) except that the efficiency limit requirement (0,91) is not applicable to LED lamp control gears.

#### **7.2.1.2 Functionality requirements**

In Annex III (of the EU Regulation), point 2.3, functionality requirements are given concerning control devices:

*“When a dimming control device is switched on at its lowest control setting for which the operated lamps consume power, the operated lamps shall emit at least 1 % of their luminous flux at full load”.*

The purpose of this requirement is that the user can differentiate between the minimum dimming operation and switched off mode and do not unintentionally leave the circuit on minimum dimming mode to consume unnecessary energy.

This requirement is verified according according to clause 3 in the Annex IV of the EU Regulation 1194/2012, where it is said that the verification is done by using a filament lamp. If the control gear is designed for LED lamps (including LED modules) only, it is unclear if this requirement is applicable and what kind of filament lamps should be used for verification, e.g. what shall be the rated power and voltage of the lamp.

#### **7.2.1.3 Lamp compatibility**

Same compatibility requirements as for halogen lamp control gears (see point 7.1.1.3)

#### **7.2.1.4 Product information requirements**

Same information requirements as for halogen lamp control gears (see point 7.1.1.4)

### **7.2.2 Verification procedure for market surveillance purposes**

Same information requirements as for halogen lamp control gears (see point 7.1.2)

## **7.3 Control devices (presence detectors, dimmers, etc)**

### **7.3.1 EcoDesign requirements**

#### **7.3.1.1 Energy Efficiency requirements**

No energy efficiency requirements are given in this regulation.

#### **7.3.1.2 Functionality requirements**

In Annex III, point 2.3 of the EU Regulation 1194/2012, functionality requirements are given concerning control devices:

*“When a dimming control device is switched on at its lowest control setting for which the operated lamps consume power, the operated lamps shall emit at least 1 % of their luminous flux at full load”.*

The purpose of this requirement is that the user can differentiate the minimum dimming operation and the switched off mode and do not unintentionally leave the lamp burning at the minimum dimming position but switches the circuit off to save energy when the lights are not needed.

#### **7.3.1.3 Lamp compatibility**

Same compatibility requirements as for halogen lamp control gears (see point 7.1.1.3).

#### **7.3.1.4 Product information requirements**

Product information requirements given in Annex III point 3.3 of the EU Regulation 1194/2012 apply also to control devices:

*“As from stage 2, if the equipment provides no compatibility with any of the energy-saving lamps according to part 2.3 of this Annex, a warning that the equipment is not compatible with energy-saving lamps shall be published on publicly available free-access websites and in other forms the manufacturer deems appropriate”.*

This is interpreted so that the compatibility requirements are not required if the warning notice is provided.

#### **7.3.2 Verification procedure for market surveillance purposes**

The verification of the compatibility and minimum flux is required for control gears. Same notes apply as in the previous points for halogen control gears (point 7.1.2). The verification is tested using filament lamps.



## **7.4 Luminaires (other than luminaires for fluorescent and HID lamps)**

### **7.4.1 EcoDesign requirements**

The luminaires under scope of this Regulation are those designed to operate:

- directional and/or non-directional:
- filament lamps (both incandescent and halogen, for mains or low-voltage supply),
- compact fluorescent lamps with integrated ballast and
- LED lamps or modules

The ecodesign requirements applicable to luminaires are not related specifically to the luminaire efficiency, but to the lamp characteristics (and to the compatibility of the luminaire with specific type of lamp).

The information related to the compatibility of the luminaire with specific type of lamp shall be always provided also if the luminaire is supplied together with the lamp (in the luminaire package).

By the new ecodesign EU Regulation, LED modules have now a full range of requirements under CE marking, both for energy efficiency and functionality. They can be placed on the market as CE products directly by specific importer / responsible vendor or supplied as specific part for luminaire manufacture, directly by luminaire manufacturer. The manufacturer of LED luminaire shall identify his legal position regarding the LED module with respect to the responsibility deriving from the commercial activity. If responsibility is given, he will prove that the modules used in the luminaires comply with the Ecodesign requirements by 4 different “routes” according to point 2 of Annex IV to EU Regulation 1194/2012.

The point 3 of Annex IV to EU Regulation 1194/2012 allows the possibility to provide specific information in case of luminaires not compatible with either Class A or above lamp (according to the reference to Regulation 874/2012).

#### **7.4.1.1 No Energy Efficiency requirements**

There are no specific energy efficiency requirements for luminaire as a whole. In fact the EEI limits set out in this EU Regulation are considering reference power and the power consumed by the lamp/s as a single unit but today there is no suitable set of requirements for proper considering that luminaires have to perform lighting with additional means to the light sources such as reflectors, shields, louvres, filter, etc. and

the task to be performed or simply serving decorative purposes. Furthermore it has to be considered that the light output could be adjusted, reduced, modulated, or simply modified. That's why neither photometric requirements nor requirements for minimum energy efficiency of the lamp provided or compatible with are imposed by the legislation. Essentially, the overall energy efficiency and light distribution of any installation that uses lamps and luminaire are determined by the design of the installation itself. So the limit set out in this Regulation are not proper and not usable for any type of luminaire.

Furthermore the EU Regulation should not impose any limit to the free circulation on the EU market of any CE marked product.

#### **7.4.1.2 No functionality requirements**

There are no functionality requirements for luminaires; they are set out for light sources designed to be used together with luminaire and they are specified in Table 4, Table 5 and Table 12 as in chapter 6 of this guide. The only one could be the compatibility and it is duly explained in the next paragraph.

#### **7.4.1.3 Lamp compatibility**

The requirements of this Regulation, and the acceptance criteria specified in the Verification procedure of the Annex IV (Annex IV.3) of the Regulation - see also chapter 8.1, allow the use of luminaires compatible with lamps available on the EU market; this was the intention of the EU Commission as also confirmed by relevant statements in the explanatory notes. It is not the intention of the EU Regulation to ban any luminaire type (such as R7s lamp cap) but awareness of EU end-user must be improved by specific product information so that the proper choice can be done. The capability of the luminaire design have to be properly communicated via the new luminaire label as required by EU Regulation 874/2012.

From 1st September 2014 the luminaire shall be compatible with lamps (or end user replaceable modules) with EEI at least:

- 0,24 for non-directional lamps,
- 0,40 for directional lamps.

Even if EC Regulation 244/2009 is not requiring any EEI limit for non directional lamps, the calculation has to be done by using in the formula of point 1.1 of Annex III to EU Regulation 1194/2012, and the rated luminous flux for such type of lamp is the “useful luminous flux”. This is also defined in table 3 of EU Regulation 874/2012, Annex VII.

The following information ensures to the end user a proper choice when buying at the intended product the point of sale; the completeness for information to be addressed to end user is achieved by the specification of the energy efficiency class of lamp/s sold together with the luminaire packaging, if the case.

If no lamp is provided together with the luminaire, no further information have to be provided with; in case light source/s is/are provided with-in the luminaire package to the market, it shall be one of the two best classes which have to be declared to be compatible with the luminaire.

It further means that not all lamps matching the declared Class/es can be compatible with the luminaire because it is still necessary to guarantee the respect for any possible limitation arising from e.g. lamp cap type or functionality capability (e.g. dimming or not) imposed by the luminaire design. A proper marking on the luminaire and / or mounting instruction sheet will complete the information on this respect. A single combination is enough to justify the declaration of compatibility. The combination with lamp/s of the declared class/es is demonstrated by adding the necessary documentation to the TDF (see also the explanation in chapter 8.1.3)

At the present the compatibility can be assessed by considering the following:

- The lamp can be fitted inside the luminaire without any change of the luminaire construction
- The lamp can be operated without any malfunction both when operated and/or regulated (like flickering, noise, overheating, and so on);
- The safety is not impaired and the evaluation shall be done according to the safety standards available.

#### 7.4.1.4 Product information requirements

If the luminaire for filament lamps (both incandescent and halogen, for mains or low-voltage supply) or for compact fluorescent lamps with integrated ballast (CFLi) or for LED lamps or modules meets the compatibility requirements (see 8.1), no further product information has to be provided under the provisions of EU Regulation 1194/2012.

Additional product information is only required when those compatibility requirements are not met and the information required by EU Regulation 874/2012 (luminaire label) becomes the only way to demonstrate the compliance with Ecodesign (CE Marking). Details can be found in the specific LightingEurope Guide for the application of the Commission Regulation (EU) n<sup>o</sup>. 874/2012 with regard to energy labelling of electrical lamps and luminaires available at:

- <http://www.lightingeurope.org/library>.

#### 7.4.1.5 Label for luminaires and related information

The new label for luminaires intended to be marketed through a point of sale which applies from 1<sup>st</sup> March 2014 will become also the conformity parameter for every luminaire falling under the scope of EU Regulation 1194/2012 and not matching requirement on compatibility with Class A lamps (or above), from 1<sup>st</sup> September 2014 and on. It will inform the buyer on the type of lamp/s related but not giving any information on the efficiency of the luminaire itself.

The information to be always provided with luminaires are:

1. Supplier's name or trade mark;
2. Supplier's model identifier;
3. Relevant sentence on compatibility with lamps or provided with LED modules not removable by end-users;
4. Range of energy-efficiency classes of compatible lamp/s, or if the case, the classes of lamps with which the luminaire is not compatible;
5. If the case, "The luminaire is sold with a bulb of the energy class: [*the appropriate energy classes shall be reported*]".

The information has to be provided anyhow on price quote or tender offer disclosing energy-related or price information for a specific luminaire as well as in any technical documentation by which the luminaire is promoted; it means that even if the label is not required e.g. when distance selling, its content is mandatorily provided. This can be made in fully textual form.

#### **7.4.1.6 Format of the label for luminaires**

The EU Regulation 874/2012 permits the label to be made available free of charge to dealers either in electronic (e.g. downloadable from the manufacturers WEB site) or paper format. Supply of the label in electronic format only is deemed to satisfy this requirement and this is recommended by the industry.

When the supplier chooses to supply labels only on request from dealers, the supplier shall deliver the labels promptly.

Where luminaires are displayed in their packaging at point of sale the provision of the label by printing it on the luminaire pack is considered as fulfilling the supplier obligation of this Regulation. The label may need to be included on the front face of the pack<sup>4</sup>; in this case the inclusion of the luminaire part number and manufacturers' name or logo are not required on the label as the label is obviously related to the luminaire within the pack. This approach is considered typical for retailer own brand luminaires which are in one language.

The label shall be made available in the relevant language version/s.

#### **7.4.1.7 Languages of the label for luminaires**

The industry view concerning which language versions of the text maybe used in the label for luminaires is that it shall be available in all needed versions related to countries in which the luminaire manufacturer's business is demonstrated by his direct connection with dealers.

Most popular European languages, even not officially recognised in those countries can be considered as equivalent. A survey performed by the European institutions demonstrated that very often the English language is very popular in Countries such as in Denmark, Netherlands, Finland, etc...

Industry considers that by providing the label for luminaires in the language/s shown in the table below the requirement set out in the EU Regulation "*The label shall be the relevant language version*" is considered to be met.

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<sup>4</sup> For the dealer to fulfil their obligations (Article 4 point 2 of EU Regulation 874/2012).

<b>COUNTRIES</b>	<b>OFFICIAL LANGUAGES</b>	<b>OTHER ACCEPTED LANGUAGES</b>
Austria	German Slovene, Croatian, Hungarian (each official in one region)	English
Belgium	French, Dutch and German	
Bulgaria	Bulgarian	
Cyprus	Greek and Turkish	English
Czech Republic	Czech	
Croatia	Croatian	
Denmark	Danish	English
Estonia	Estonian	Russian
Finland	Finnish & Swedish	English
France	French	
Germany	German	
Greece	Greek	
Hungary	Hungarian	
Ireland	Irish and English	
Italy	Italian	
Latvia	Latvian	Russian
Lithuania	Lithuanian	Russian & Polish
Luxemburg	Luxembourgish & French & German	
Malta	Maltese & English	
Netherlands	Dutch (+ Friesian in Friesland)	English
Poland	Polish	
Portugal	Portuguese	
Romania	Romanian	Hungarian
Slovakia	Slovak	Czech, Hungarian
Slovenia	Slovene	Serbo-Croatian
Spain	Spanish	Catalan, Galician, Basque
Sweden	Swedish	English
United Kingdom	English	

### 7.4.1.8 Label layout

The Regulation gives in details how to complete the information to be provided with the label for luminaires. The label dimensions are **50 mm wide and 100 mm high**.

For a proper guidance the structure has been identified by dividing into 5 specific sectors, hereafter identified by Roman numbering system:

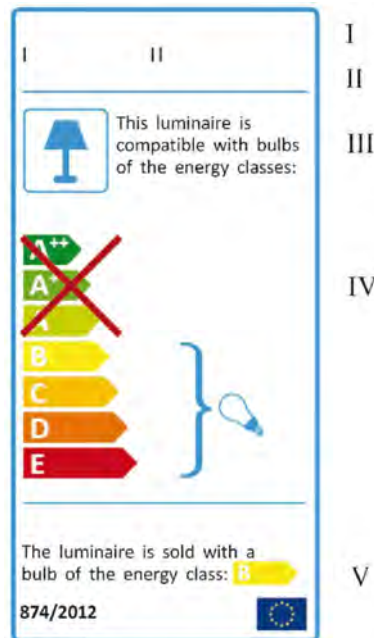


Figure 33 - Example of label for luminaire

#### The content details of the label are:

- I. Supplier's name (or trade mark);
- II. Supplier's model identifier (e.g. alphanumeric code to distinguish a specific luminaire model from another one with the same trade mark);
- III. Sentence as shown, in the language/s of the Member State/s, or one of its alternatives from the examples below, as applicable. Instead of the word 'luminaire', a more precise term may be used describing the particular luminaire type or the product into which the luminaire is integrated (such as "furniture", "book shelf", etc.), as long as it remains clear that the term refers to the product on sale that operates the light sources.
- IV. The range of energy-efficiency classes of lamp/s, accompanied by:

- a ‘bulb’ pictogram indicating the classes of lamps (if replaceable by End-users) with which the luminaire is compatible according to state-of-the-art requirements for compatibility; at the present as defined in the new ecodesign EU Regulation, compatibility means that when the lamp is intended to be operated by the luminaire, once having duly installed it (by insertion and/or connection), shortly after starting to use them together, end-users are not led to believe that any of the products has a defect and the safety risk of using the products together is not higher than when the same products taken individually are used in combination with other products.
  - a cross over the classes of lamps with which the luminaire is not compatible according to state-of-the-art requirements for compatibility;
- V. If the luminaire operates with **lamps that are replaceable by the end-user**, and such lamps are included in the packaging of the luminaire, the sentence to be reported has to be: “The luminaire is sold with a bulb of the energy class: [the appropriate energy classes shall be reported]”.

Where necessary, the sentence can be adjusted to refer to one lamp or several lamps, and several energy classes can be listed, too.

If the luminaire contains only **LED modules not intended to be removed** by the end-user, the sentence to be reported has to be: “**The lamps cannot be changed in the luminaire**” (or in the “specific product” into which the luminaire is integrated, as indicated below.

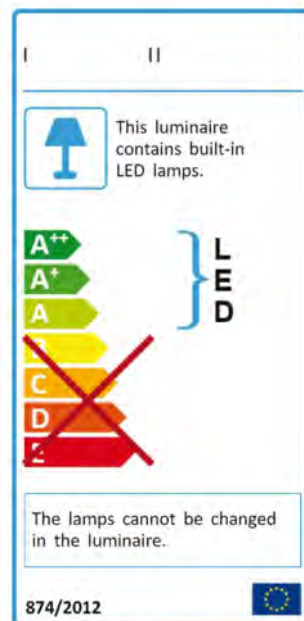


Figure 34 - Example of label for luminaire containing non-removable LED modules



If the luminaire contains **both non-replaceable LED modules and sockets (lamp caps) for user-replaceable lamps, with lamps included**, the sentence to be reported is shown in the following picture:

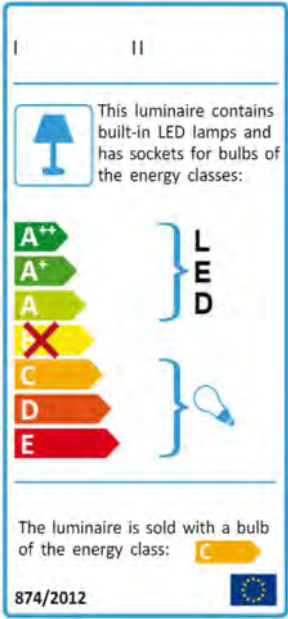


Figure 35 - Example of label for luminaire containing a combination of non-replaceable LED modules with replaceable lamp/s

If the luminaire contains **both LED modules not intended to be removed by the end-user and sockets for replaceable lamps**, and such lamps are not included with the luminaire, the sentence to be reported is shown in the following picture:

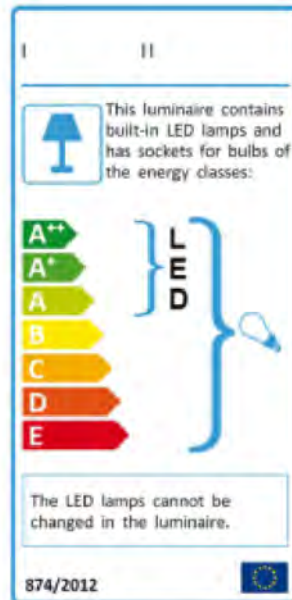


Figure 36 - Example of label for luminaire containing a combination of non-replaceable LED modules with replaceable lamp/s but lamp/s are not included within the luminaire packaging

### When lamps are not provided with the luminaire

If the luminaire operates only with lamps that are replaceable by the end-user and there are no such lamps included with the luminaire, the relevant space shall be left empty, as shown in the figure below.

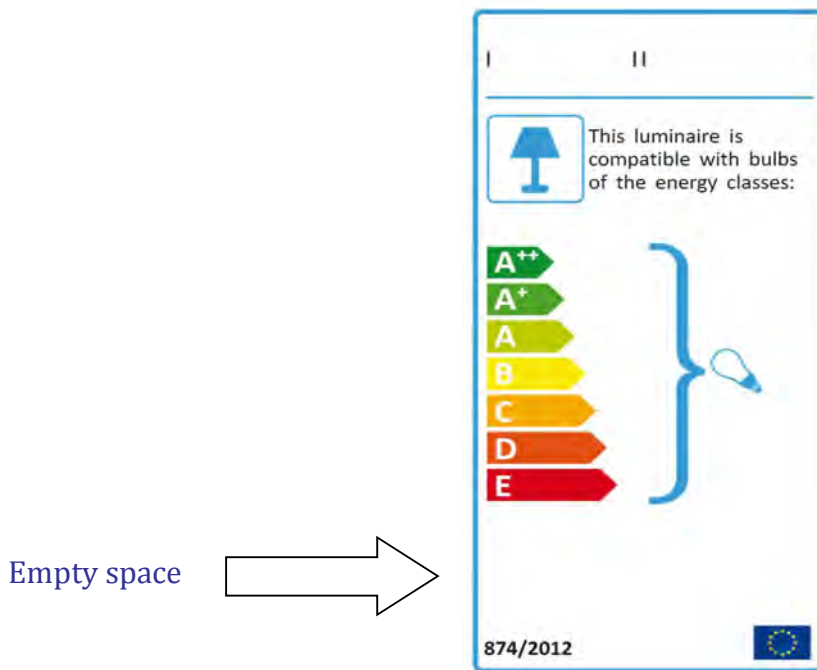


Figure 37 - Example of label for luminaire operating replaceable lamp/s but lamp/s are not included within the luminaire packaging

### Luminaire Logo



The Luminaire logo to be used in the label for luminaire is 13 mm x 13 mm pictogram may vary for better understanding or it can be the supplier's own pictogram or photo, if it describes better the luminaire belonging to the label.

The label for luminaires may also be displayed in horizontal orientation, in which case it shall be at least 100 mm wide and 50 mm high.

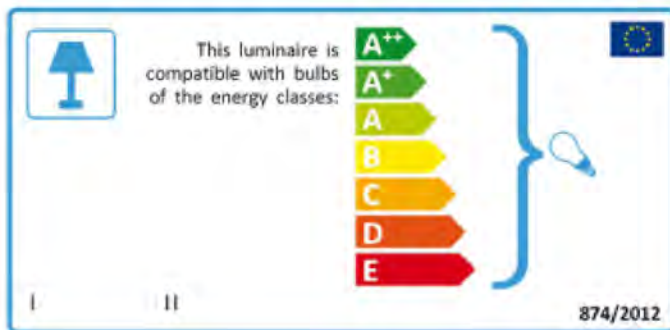
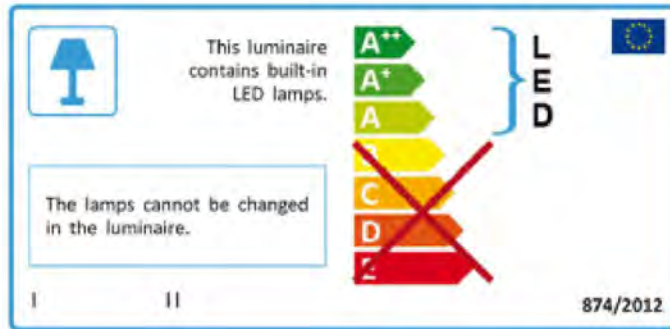
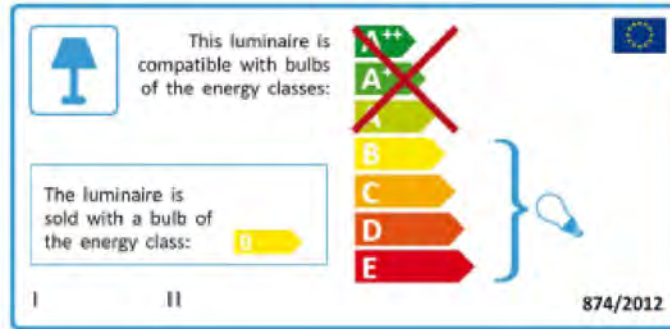


Figure 38 - Further examples of labels with horizontal orientation

## 8 Market Surveillance

### 8.1 Verification procedure for market surveillance purposes

The beginning of Annex IV (of the EU Regulation) sets general provisions for the market surveillance authorities:

*"The market surveillance authorities shall provide the information of the testing results to other Member States and to the Commission.*

*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 first provision sets clear rules in the communication between the national market surveillance authorities of the EU Member States. This is important for the manufacturers to avoid unnecessary testing already done in another EU Member State for the same product.

The second provision sets the link to available acknowledged, standardized measurement methods taken from EN standards wherever possible. Where gaps have to be filled international standardization bodies are busy to deliver the missing standards in time, on the basis of official standardization Mandates from the European Commission.

Annex IV (of the EU Regulation) splits the verification procedure for market surveillance purposes into two parts regarding light sources (lamps and LED modules):

- 1) Verification procedure for lamps other than led lamps and for led lamps that are meant to be replaced in the luminaire by the end-user.
- 2) Verification procedure for led modules not intended to be removed from the luminaire by the end-user.

#### **8.1.1 Verification procedure for lamps other than LED lamps and for LED lamps that are meant to be replaced in the luminaire by the end-user**

The lamps (or end-user replaceable LED modules) can be tested easily themselves without the luminaire and have to fulfil the following:

- (a) to deliver the required and correct product information

(b) to comply with the compatibility provisions of 2.1 and 2.2 of Annex III of the Regulation

(c) to comply with the given requirements tested according to the defined procedures of table 9, including compliance criteria.

### **8.1.2 Verification procedure for LED modules not intended to be removed from the luminaire by the end-user**

In order to tackle the fact that LED modules cannot always be easily extracted from LED luminaires for testing, a detailed step-by-step procedure was set up, where the single steps have to be followed one after the other by the Market Surveillance authorities and in which testing the whole luminaire as a lamp is only an option if the luminaire manufacturer specifically allows it, or if all other approaches fail. To avoid as much as possible testing the whole luminaire as a lamp step 4 of the verification procedure was added.

The aim of the discussions about the setup of the market surveillance procedures was to come to sensible, affordable procedures and additionally preventing loopholes later on.

A flow chart of the procedure with the detailed steps and the complete provisions of Annex IV 2 of the Regulation are given from LED module perspective in chapter 6.3.2. It serves also for information regarding luminaires.

### **8.1.3 Technical product information requirements for market surveillance authorities according Annex IV 2 of the EU Regulation.**

The following information has to be available for the market surveillance authority of a Member State on request

- Information, if luminaire can be tested as a lamp
- Information, if LED modules can be dismantled Yes/no
  - If yes, description how to dismantle the module
- Information, if CE marked LED module(s) are used
  - If yes, all data related to LED module type and supplier
  - If no, name and address of LED module manufacturer

## 9 Conclusions

The new EcoDesign Regulation is another important driver for the SSL transition. From the 1st September 2013 there will be the first time mandatory quality criteria for LED-lamps and modules in the European market. This seems to be a minor change for the consumer, but it is actually a major change. Good quality is the key for increased acceptance of SSL products.

Increased quality will also be the major effect from the requirements for directional lamps. Inefficient and inferior lamps can be easily replaced by a more efficient quality alternative. Even if incandescent reflector lamps will be phased-out in 2014, the difference to the halogen version will only be seen by experts.

Due to the new information requirements the regulation has not only impact on the products, but also on the processes of the manufacturers. From 1st September 2013 products can only be placed on the market, when certain information on the lamps itself, on the packaging and free access websites are provided.

## 10 Disclaimer

This information is for general guidance on matters of interest only. While we have made every attempt to ensure that the information has been obtained from reliable sources, LightingEurope is not responsible for any errors or omissions, or for the results obtained from the use of this information. All information is provided with no guarantee of completeness, accuracy, timeliness or of the results obtained from the use of this information, and without warranty of any kind, express or implied, including, but not limited to warranties of performance, merchantability and fitness for a particular purpose. In no event will LightingEurope, its related partnerships or corporations, or the partners, agents or employees thereof be liable to you or anyone else for any decision made or action taken in reliance on the information or for any consequential, special or similar damages, even if advised of the possibility of such damages.

## Annex I - Definitions

Article 2 of Regulation 1194/2012

### *Definitions*

*“In addition to the definitions set out in Article 2 of Directive 2009/125/EC, the following definitions shall apply for the purposes of this Regulation:*

- 1. ‘lighting’ means the application of light to a scene, objects or their surroundings so that they may be seen by humans;*
- 2. ‘accent lighting’ means a form of lighting where light is directed so as to highlight an object or a part of an area;*
- 3. ‘electrical lighting product’ means a product designed for use with electricity and intended for use in lighting;*
- 4. ‘special purpose product’ means a product that uses the technologies covered by this Regulation but is intended for use in special applications because of its technical parameters as described in the technical documentation. Special applications are those that require technical parameters not necessary for the purposes of lighting average scenes or objects in average circumstances. They are of the following types:*

*(a) applications where the primary purpose of the light is not lighting, such as:*

*(i) emission of light as an agent in chemical or biological processes (such as polymerisation, ultra-violet light used for curing/drying/hardening, photodynamic therapy, horticulture, petcare, anti-insect products);*

*(ii) image capture and image projection (such as camera flashlights, photocopiers, video projectors);*

*(iii) heating (such as infrared lamps);*

*(iv) signalling (such as traffic control or airfield lamps);*

*b) lighting applications where:*

*(i) the spectral distribution of the light is intended to change the appearance of the scene or object lit, in addition to making it visible (such*



*as food displaylighting or coloured lamps as defined in point 1 of Annex I), with the exception of variations in correlated colour temperature; or*

*(ii) the spectral distribution of the light is adjusted to the specific needs of particular technical equipment, in addition to making the scene or object visible for humans (such as studio lighting, show effect lighting, theatre lighting); or*

*(iii) the scene or object lit requires special protection from the negative effects of the light source (such as lighting with dedicated filtering for photosen-sitive patients or photosensitive museum exhibits); or*

*(iv) lighting is required only for emergency situations (such as emergency lighting luminaires or control gears for emergency lighting); or*

*(v) the lighting products have to withstand extreme physical conditions (such as vibrations or temperatures below – 20 °C or above 50 °C);*

*c) products incorporating lighting products, where the primary purpose is not lighting and the product is dependent on energy input in fulfilling its primary purpose during use (such as refrigerators, sewing machines, endoscopes, blood analysers);*

- 5. 'light source' means a surface or object designed to emit mainly visible optical radiation produced by a trans-formation of energy. The term 'visible' refers to a wave-length of 380-780 nm;*
- 6. 'lamp' means a unit whose performance can be assessed independently and which consists of one or more light sources. It may include additional components necessary for starting, power supply or stable operation of the unit or for distributing, filtering or transforming the optical radi-ation, in cases where those components cannot be removed without permanently damaging the unit;*
- 7. 'lamp cap' means that part of a lamp which provides connection to the electrical supply by means of a lamp holder or lamp connector and may also serve to retain the lamp in the lamp holder;*
- 8. 'lamp holder' or 'socket' means a device which holds the lamp in position, usually by having the cap inserted in it, in which case it also provides the means of connecting the lamp to the electric supply;*
- 9. 'directional lamp' means a lamp having at least 80 % light output within a solid angle of  $\pi$  sr (corresponding to a cone with angle of 120°);*
- 10. 'non-directional lamp' means a lamp that is not a direc-tional lamp;*

11. *'filament lamp' means a lamp in which light is produced by means of a threadlike conductor which is heated to incandescence by the passage of an electric current. The lamp may contain gases influencing the process of incandescence;*
12. *'incandescent lamp' means a filament lamp in which the filament operates in an evacuated bulb or is surrounded by inert gas;*
13. *'(tungsten) halogen lamp' means a filament lamp in which the filament is made of tungsten and is surrounded by gas containing halogens or halogen compounds; it may be supplied with an integrated power supply;*
14. *'discharge lamp' means a lamp in which the light is produced, directly or indirectly, by an electric discharge through a gas, a metal vapour or a mixture of several gases and vapours;*
15. *'fluorescent lamp' means a discharge lamp 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 lamps may be supplied with an integrated ballast;*
16. *'fluorescent lamp without integrated ballast' means a single- or double-capped fluorescent lamp without integrated ballast;*
17. *'high intensity discharge lamp' means an electric discharge lamp 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;*
18. *'light emitting diode (LED)' means a light source which consists of a solid state device embodying a p-n junction of inorganic material. The junction emits optical radiation when excited by an electric current;*
19. *'LED package' means an assembly having one or more LED(s). The assembly may include an optical element and thermal, mechanical and electrical interfaces;*
20. *'LED module' means an assembly having no cap and incorporating one or more LED packages on a printed circuit board. The assembly may have electrical, optical, mechanical and thermal components, interfaces and control gear;*
21. *'LED lamp' means a lamp incorporating one or more LED modules. The lamp may be equipped with a cap;*
22. *'lamp control gear' means a device located between the electrical supply and one or more lamps, which provides a functionality related to the operation of the*

*lamp(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 lamp control gear to perform these functions. The term does not include:*

- control devices*
- power supplies within the scope of Commission Regulation (EC) No 278/2009 <sup>(5)</sup>;*

- 23. 'control device' means an electronic or mechanical device controlling or monitoring the luminous flux of the lamp by other means than power conversion, such as timer switches, occupancy sensors, light sensors and daylight regulation devices. In addition, phase cut dimmers shall also be considered as control devices;*
- 24. 'external lamp control gear' means non-integrated lamp control gear designed to be installed outside the enclosure of a lamp or luminaire, or to be removed from the enclosure without permanently damaging the lamp or the luminaire;*
- 25. 'ballast' means lamp control gear inserted between the supply and one or more discharge lamps which, by means of inductance, capacitance or a combination of inductance and capacitance, serves mainly to limit the current of the lamp(s) to the required value;*
- 26. 'halogen lamp control gear' means lamp control gear that transforms mains voltage to extra low voltage for halogen lamps;*
- 27. 'compact fluorescent lamp' means a fluorescent lamp that includes all the components necessary for starting and stable operation of the lamp;*
- 28. 'luminaire' means an apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes all the parts necessary for supporting, fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply;*
- 29. 'end-user' means a natural person buying or expected to buy a product for purposes which are outside his trade, business, craft or profession;*
- 30. 'final owner' means the person or entity owning a product during the use phase of its life cycle, or any person or entity acting on behalf of such a person or entity.*

*For the purposes of Annexes III to V, the definitions set out in Annex II shall also apply".*

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<sup>5</sup> OJ L 93, 7.4.2009, p.3.

## Annex II - Industry position on “*placing on the market*”

Available at:

[http://www.elcfed.org/documents/Position\\_ELC\\_Placing%20on%20the%20market\\_20090416\\_final.pdf](http://www.elcfed.org/documents/Position_ELC_Placing%20on%20the%20market_20090416_final.pdf)



22<sup>nd</sup> April 2009

### **ELC Position Paper on the Term „placing on the market” of the Directive 2005/35/EC on Ecodesign Requirements for Energy-using Products (the „EUP Directive”)**

The draft implementing measure for domestic lamps (Commission Regulation implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps) provides that Stage 1 of the ecodesign requirement shall apply from 1st September 2009, therefore the clarification of the term “placing on the market” is of essential importance for the entire lighting industry and consumers as it relates to goods designed for mass market. Legal certainty is crucial both in order to be able to predict requirements within the supply chain of each manufacturer and for Member State authorities to be able to have a consistent basis for market surveillance.

The EUP Directive defines the term „placing on the market” as “making an EuP available for the first time on the Community market with a view to its distribution or use within the Community whether for reward or free of charge and irrespective of the selling technique”.

The European Commission gives more explanation in the Guide to the implementation of directives based on the New Approach and the Global Approach (Blue Book), according to which “a product is placed on the Community market when it is made available for the first time. This is considered to take place when a product is transferred from the stage of manufacture with the intention of distribution or use on the Community market ... The transfer of the product takes place ... from the manufacturer ... to the person responsible for distributing the product on the Community market. (Footnote (31): the distribution chain can also be the commercial chain of the manufacturer...). ... the product is considered to be transferred either when the physical hand-over or the transfer of ownership has taken place. This transfer can be for payment or free of charge, and it can be based on any type of legal instrument. Thus, a transfer of a product is considered to have taken place, for instance, in the circumstances of sale, loan, hire, leasing and gift.”

The Blue Book also provides a list of cases, when “placing on the market” is not considered to taken place, if a product is:

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- transferred from the manufacturer in a third country to an authorized representative in the Community whom the manufacturer has engaged to ensure that the product complies with the directive;
- transferred to a manufacturer for further measures (for example assembling, packaging, processing or labeling);
- not (yet) granted release for free circulation by customs, or has been placed under another customs procedure (for example transit, warehousing or temporary importation), or is in a free zone;
- manufactured in a Member State with a view to exporting it to a third country;
- displayed at trade fairs, exhibitions or demonstrations; or
- in the stocks of the manufacturer, or the authorized representative established in the Community, where the product is not yet made available, unless otherwise provided for in the applicable directives

In order to provide further guidance in the practical interpretation of the term “placing on the market”, the ELC sets out below the industry understanding thereof, considering four scenarios and using information available from the EUP Directive and available Commission guidance document.

#### 1.) Private label products

The EUP Directive sets out that a brand owner is regarded as “manufacturer” when the EUP is placed on the market under the manufacturer’s own name or trademark. This, together with the requirement as per article 3 of the EUP Directive that “...EUP’s covered by implementing measures may be placed on the market ... only if they comply with those measures ...” means that a product being transferred from the stage of manufacture, if there are no further measures (e.g. assembling, packaging, processing or labelling) carried out at or by the brand owner, is regarded to be placed on the market. Hence, once a private label product is transferred<sup>1</sup> to a brand owner and enters the private label owner’s distribution chain before the 1. September deadline, in its entirely final form and final packaging, without any further measures, including without limitation conducting a conformity assessment, other than preparing the products for shipment, to be carried out at or by the brand owner, then that product is considered to be placed on the market and can be further marketed by the brand owner.

<sup>1</sup> The product is considered to be transferred either when the physical hand-over or the transfer of ownership has taken place.



## **2.) Manufacture and Storage in the EU**

Taking into account the definition of placing on the market in the EUP Directive and the clarification notes from the Blue Book it is our understanding that a final product manufactured in the EU is considered to be placed on the market when the manufacturing process is fully completed (no more packaging, labelling, assembling needed), the product is transferred from the stage of manufacture (both physically and administratively, documented in the books and database of the manufacturer) to the distribution chain (whether it is a third party distributor or the commercial chain of the manufacturer responsible for distributing the product, e.g., a distribution warehouse of the manufacturer), hence the final product is made available and ready for shipment. Preparing the products for their shipment within the distribution chain (e.g. wrapping final and packaged products for shipment, putting products on euro-pallets, wrapping pallets with plastic film for shipment) is not considered as “packing” within the manufacturing process.

## **3.) Importing**

It is clear from the EUP Directive and the Blue Book that in case of importing to EU from outside of EU, the finished product is put on the market when it is released by EU customs authorities.

## **4.) Assembled lighting products**

In this scenario the lamps are built into and sold together with other products e.g. fixtures. In this case the person who mounts and sells the lamps and fixtures together is not considered to be manufacturer, since he is not distributing the lamps under his name or trade mark, and he is not changing the intended use and purpose of the lamp. Therefore the general rules apply to these lamps, i.e. they are placed on the market as individual EuPs as and when they are made available for the first time on the Community Market with a view to their distribution or use within the Community - see point 2. above and thus, there is no limitation to build in such lamps into any devices.

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