

# **DRAFT COMMUNIQUE ON ECODESIGN REQUIREMENTS FOR LIGHT SOURCES AND SEPARATE CONTROL GEARS (2019/2020/AB) (SGM:2021/...)**

## **Objective**

**ARTICLE 1** – (1) The purpose of this Communique is to establish ecodesign requirements for the placing on the market and/or putting into service of light sources and separate control gears related to the implementation of the Regulation on the Ecodesign of Energy-Related Products (2009/125/EC) published in the Official Gazette numbered dated 07/10/2010 and No. 27722.

## **Scope**

**ARTICLE 2**– (1) This Communique shall apply to light sources and separate control gears.

(2) This Communique shall not apply to light sources and separate control gears specified in points 1 and 3 of Annex-III.

(3) Light sources and separate control gears specified in point 4 of Annex III shall comply only with the requirements of point 3(6) of Annex II.

## **Legal Basis**

**ARTICLE 3** – (1) This Communique has been prepared on the basis of the Law No. 4703 of 29/6/2001 on the Preparation and Implementation of Technical Legislation on Products and Presidential Decree No. 1 on the Presidency Organization published in the Official Gazette No. 30474 dated 10/7/2018.

## **Compliance with the European Union Legislation**

**ARTICLE 4** – (1) This Communique has been prepared based on Commission Regulation (EU) 2019/2020 and (EU) 2021/341 , laying down ecodesign requirements of light sources and separate control gears in the framework of alignment with the legislation of European Union.

## **Definitions**

**ARTICLE 5** – (1) For the purpose of this Communique the following definitions shall apply:

- a) ‘EU’ means European Union,
- b) ‘Incandescence’ means the phenomenon where light is produced from heat, in light sources typically produced through a threadlike conductor (‘filament’) which is heated by the passage of an electric current,
- c) ‘Separate control gear’ means a control gear that is not physically integrated with a light source and is placed on the market as a separate product or as a part of a containing product,
- ç) ‘Ministry’ means Ministry of Industry and Technology,

d) 'Mains' means the electricity supply of 230 ( $\pm 10\%$ ) volt of alternating current at 50 Hz,

e) 'Equivalent model' means a model with the same technical characteristics relevant for the ecodesign requirements, but that is placed on the market or put into service by the same manufacturer or importer as another model with a different model identifier;

f) 'Fluorescence' (FL) means the phenomenon or a light source in which magnetic induction light sources are included for the purposes of this Communiqué, that may have one ('single-capped') or two ('double-capped') connections ('caps') to their electricity supply, using an electric gas discharge of the low-pressure mercury type in which most of the light is emitted by one or more layers of phosphors excited by the ultraviolet radiation from the discharge,

g) 'Gas discharge' means a phenomenon where light is produced, directly or indirectly, by an electric discharge through a gas, plasma, metal vapour or mixture of gases and vapours,

ğ) 'Model identifier' means the code, usually alphanumeric, which distinguishes a specific product model from other models with the same trade mark or the same manufacturer's or importer's name,

h) 'Halogen light source' means an incandescent light source with a threadlike conductor made from tungsten surrounded by gas containing halogens or halogen compounds,

ı) 'Light' means electromagnetic radiation with a wavelength between 380 nm and 780 nm,

i) 'luminous flux' ( $\Phi$ ), expressed in lumen (lm), means the quantity derived from radiant flux (radiant power) by evaluating the electromagnetic radiation in accordance with the spectral sensitivity of the human eye; referring to the total flux emitted by a light source in a solid angle of  $4\pi$  steradians under conditions (e.g. current, voltage, temperature) specified in applicable standards, referring to the initial flux for the undimmed light source after a short operating period, unless it is clearly specified that the flux in a dimmed condition or the flux after a given period of operation is intended and for light sources that can be tuned to emit different light spectra and/or different maximum light intensities, referring to the flux in the 'reference control settings' as defined in Annex I,

j) 'Light source' means an electrically operated product using incandescence, fluorescence, high-intensity discharge, inorganic light emitting diodes (LED) or organic light emitting diodes (OLED), or their combinations as lighting technology, and that can be verified as a light source according to the procedure of Annex IV. , intended to emit, or, in the case of a non-incandescent light source, intended to be possibly tuned to emit, light, or both, with all of the following optical characteristics,

1) chromaticity coordinates  $x$  and  $y$  in the range

$0,270 < x < 0,530$  and  $2,3172 x^2 + 2,3653 x - 0,2199 < y < - 2,3172 x^2 + 2,3653 x - 0,1595$ ;

2) a luminous flux  $< 500$  lumen per  $\text{mm}^2$  of projected light-emitting surface area as defined in Annex I;

3) a luminous flux between 60 and 82 000 lumen;

4) a colour rendering index (CRI) > 0;

5) High-pressure sodium (HPS) light sources that do not fulfil condition (a) are considered light sources for the purposes of this Communiqué.

6) Light sources do not include:

(a) LED dies or LED chips;

(b) LED packages;

(c) products containing light source(s) from which these light source(s) can be removed for verification;

(c) light-emitting parts contained in a light source from which these parts cannot be removed for verification as a light source;

k) “containing product” means a product containing one or more light sources, or separate control gears, or both, including, but not limited to, luminaires that can be taken apart to allow separate verification of the contained light source(s), household appliances containing light source(s), furniture (shelves, mirrors, display cabinets) containing light source(s),

l) ‘Inorganic light emitting diode’ (LED) means a technology in which light is produced from a solid state device embodying a p-n junction of inorganic material that emits optical radiation when excited by an electric current,

m) ‘Control gear’ means one or more devices, that may or may not be physically integrated in a light source, intended to prepare the mains for the electric format required by one or more specific light sources within boundary conditions set by electric safety and electromagnetic compatibility,

1) It may include transforming the supply and starting voltage, limiting operational and preheating current, preventing cold starting, correcting the power factor and/or reducing radio interference.

2) The term ‘control gear’ does not include power supplies within the scope of Communiqué on Ecodesign Requirements of External Power Supplies published in the Official Gazette dated 01/09/2020 and numbered 31231 (2019/1782/EU) (SGM: 2020 /5). The term also does not include lighting control parts and non-lighting parts (as defined in Annex I), although such parts may be physically integrated with a control gear or marketed together as a single product.

3) A Power over Ethernet (PoE) switch is not a control gear in the sense of this Communiqué. ‘Power-over-Ethernet switch’ or ‘PoE switch’ means equipment for power-supply and data-handling that is installed between the mains and office equipment and/or light sources for the purpose of data transfer and power supply;

n) ‘LED package’ means a single electric part comprising principally at least one LED die. It does not include a control gear or parts of it, a cap or active electronic components and is not connected directly to the mains voltage. It can include one or more of the following: optical elements, light converters (phosphors), thermal, mechanical and electric interfaces or

parts to address electrostatic discharge concerns. Any light-emitting devices that are intended to be used directly in an LED luminaire, are considered to be light sources,

o) ‘LED chip’ means a small block of light-emitting semiconducting material on which a functional LED circuit is fabricated,

ö) ‘end-user’ means a natural person buying or expected to buy a product for purposes which are outside his trade, business, craft or profession.

p) ‘Organic light emitting diode’ (OLED) means a technology in which light is produced from a solid state device embodying a p-n junction of organic material that emits optical radiation when excited by an electric current,

r) ‘Colour rendering index’ (CRI) means a metric quantifying the effect of an illuminant on the colour appearance of objects by conscious or subconscious comparison with their colour appearance under the reference illuminant and is the average Ra of the colour rendering for the first 8 test colours (R1-R8) defined in standards,

s) ‘Chromaticity’ means the property of a colour stimulus defined by its chromaticity coordinates (x and y),

ş) ‘High-pressure sodium light source’ (HPS) means a high intensity discharge light source that may have one (‘single-ended’) or two (‘double-ended’) connectors to their electricity supply and which the light is produced mainly by radiation from sodium vapour operating at a partial pressure of the order of 10 kilopascals.

t) ‘High intensity discharge’ (HID) means an electric gas discharge, limited to metal halide, high-pressure sodium and mercury vapour types, as defined in Annex I, in which the light-producing arc is stabilised by wall temperature and the arc chamber has a bulb wall loading in excess of 3 watts per square centimetre,

(2) Additional definitions are set out in Annex I.

### **Ecodesign requirements**

**ARTICLE 6** – (1) The ecodesign requirements set out in Annex II shall apply from the dates indicated therein.

### **Removal of light sources and separate control gears**

**ARTICLE 7** – (1) Manufacturers, importers or authorised representatives of containing products shall ensure that light sources and separate control gears can be replaced with the use of common available tools and without permanent damage to the containing product, unless a technical justification related to the functionality of the containing product is provided in the technical documentation explaining why the replacement of light sources and separate control gear is not appropriate.

(2) Manufacturers, importers or authorised representatives of containing products shall ensure that light sources and separate control gears can be removed without being permanently damaged for verification purposes by market surveillance authorities. Instructions on how to do this shall be provided in the technical documentation.

(3) Manufacturers, importers or authorised representatives of containing products shall provide information about the replaceability or non-replaceability of light sources and control gears by end-users or qualified persons without permanent damage to the containing product. Such information shall be available on a free-access website. For products sold directly to end-users, this information shall be on the packaging, at least in the form of a pictogram, and in the user instructions.

(4) Manufacturers, importers or authorised representatives of containing products shall ensure that light sources and separate control gears can be dismantled from containing products at end of life. Dismantling instructions shall be available on a free access website.

### **Conformity assessment**

**ARTICLE 8** – (1) The conformity assessment procedure referred to in Article 11 of Regulation on the Ecodesign of Energy-Related Products shall be the internal design control system set out in Annex IV to that Regulation or the management system set out in Annex V to that Regulation.

(2) For the purposes of the conformity assessment pursuant to Article 11 of Regulation on the Ecodesign of Energy-Related Products, the technical documentation shall contain the information set out in point 3(6)(b) of Annex II and the details and the results of the calculations in accordance with points 1 and 2 of Annex II, and Annex V to this Communiqué.

(3) Where the information included in the technical documentation for a particular model has been obtained using either or both of the methods listed below, the technical documentation shall include the details of such calculation, the assessment undertaken by the manufacturer to verify the accuracy of the calculation and, where appropriate, the declaration of identity between the models of different manufacturers. The technical documentation shall include a list of all equivalent models, including model identifiers, that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer, or from another model of a different supplier by design or calculation based on an extrapolation.

(4) The technical documentation shall include the information in the order and as set out in Annex VI of Communiqué on Energy Labelling of Light Sources. For market surveillance purposes, manufacturers, importers or authorised representatives may, without prejudice to point 3(f) of Annex IV of Regulation on the Ecodesign of Energy-Related Products, refer to the technical documentation uploaded to the product database which contains the same information laid down in Communiqué on Energy Labelling of Light Sources.

### **Verification Procedure for Market Surveillance Purposes**

**ARTICLE 9** – (1) The Ministry shall apply the verification procedure set out in Annex IV to this Communiqué when performing the market surveillance checks referred to in Article 6 point 2 of Regulation on the Ecodesign of Energy-Related Products (2009/125/EC).

### **Circumvention and software updates**

**ARTICLE 10** – (1) The manufacturer, importer or authorised representative shall not place on the market products designed to be able to detect they are being tested (for example, by recognising the test conditions or test cycle) and to react specifically by automatically

altering their performance during the test with the aim of reaching a more favourable level for any of the parameters in the technical documentation or included in any documentation provided.

(2) The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user prior to the update. No performance change shall occur as a result of rejecting the update.

(3) A software update shall never have the effect of changing the product's performance in a way that makes it noncompliant with the ecodesign requirements applicable for the declaration of conformity.

### **Indicative Benchmarks**

**ARTICLE 11** – (1) The indicative benchmarks for the best-performing products and technologies available on the market at the time of adopting this Communiqué are set out in Annex VI.

### **Consultation Forum Transactions**

**ARTICLE 12** – (1) The Ministry shall participate in the meetings with respect to this Communiqué of the advisory board established by the European Commission in order to participate in studies on setting more stringent energy efficiency requirements for all light source types, in particular for non-LED light source types, and for separate control gears; setting requirements on lighting control parts; setting more stringent requirements on flicker and stroboscopic effects, while extending them to separate control gears; setting requirements on dimming, including the interaction with flicker; setting more stringent requirements on (networked) standby power; lowering or abolishing the power bonus for colour-tuneable light sources and removing the exemption for high colour purity; setting lifetime requirements; setting improved information requirements concerning lifetime, including for control gears; substituting the CRI colour rendering metric by a more adequate metric; verifying the adequacy of lumen as a stand-alone metric for the quantity of visible light; the exemptions; setting additional resource efficiency requirements for products in accordance with the principles of the circular economy, especially concerning the removability and exchangeability of light sources and control gears.

### **Repeal**

**ARTICLE 13** – (1) The Communiqué on Ecodesign Requirements for Non-directional Household Lamps (SGM-2011/9) published in the Official Gazette 27/08/2011, the Communiqué on Ecodesign Requirements For Directional Lamps, Light Emitting Diode Lamps And Related Equipment published in the Official Gazette dated 13/2/2015 and numbered 29266 and numbered 28038 and the Communiqué on Ecodesign Requirements For Fluorescent Lamps Without Integrated Ballast, For High Intensity Discharge Lamps, And For Ballasts And Luminaires able to Operate Such Lamps (SGM:2011/10) have been repealed.

### **Transitional article**

**ARTICLE 14** – (1) If no unit belonging to the same model or equivalent models was placed on the market before 1/7/2021, the units of models placed on the market between 1/7/2021 and 31/8/2021 which comply with the provisions of this Communiqué shall be

considered compliant with the requirements of Communiqué on Ecodesign Requirements for Non-directional Household Lamps (SGM: 2011/9), Communiqué on Ecodesign Requirements For Fluorescent Lamps Without Integrated Ballast, For High Intensity Discharge Lamps, And For Ballasts And Luminaires Able To Operate Such Lamps (SGM: 2011/10) and Communiqué on Ecodesign Requirements For Directional Lamps, Light Emitting Diode Lamps And Related Equipment

**Entry into Force**

**ARTICLE 15**– (1) Article 10 of this Communiqué shall enter into force on the date of publication, other provisions on 01/09/2021.

**Enforcement**

**ARTICLE 16** – (1) The provisions of this Communiqué shall be enforced by the Minister of Industry and Technology.

**DEFINITIONS APPLICABLE FOR THE ANNEXES**

1. The following definitions shall apply:

a) 'Network' means a communication infrastructure with a topology of links, an architecture, including the physical components, organisational principles, communication procedures and formats (protocols),

b) 'Networked standby power' ( $P_{net}$ ), expressed in watt, is the electric power consumption of a CLS or of a CSCG in networked standby mode,

c) 'Networked standby mode' means the condition of a CLS or a CSCG where it is connected to the power supply but the light source is intentionally not emitting light or the control gear does not supply the electric power that enables light source(s) to emit light, and is awaiting a remotely initiated trigger to return to a state with light emission, that lighting control parts are in their control mode, non-lighting parts are disconnected or switched off or their power consumption is minimised following manufacturer's instructions,

ç) 'Non-lighting parts' means parts that are integrated in a light source, or in a separate control gear, or physically separated but marketed together with a light source or separate control gear as a single product, that are not necessary for the light source to emit light at full-load, or for the separate control gear to supply the electric power that enables light source(s) to emit light at full-load, and that are not lighting control parts, that also include data-connection parts used for other functions than to control the light emission function, that include, but are not limited to: speakers (audio), cameras, repeaters for communication signals to extend the range (e.g. WiFi), parts supporting grid balance (switching to own internal batteries when necessary), battery charging, visual notification of events (mail arriving, door bell ringing, alert), use of Light Fidelity (Li-Fi, a bidirectional, high-speed and fully networked wireless communication technology) as examples,

d) 'Lighting control parts' means parts that are integrated in a light source or in a separate control gear, or physically separated but marketed together with a light source or separate control gear as a single product, that are not strictly necessary for the light source to emit light at full-load, but that enable manual- or automatic-, direct- or remote-, control of luminous intensity, chromaticity, correlated colour temperature, light spectrum and/or beam angle, including dimmers and data-connection parts as well, but not including products within the scope of Communiqué on Ecodesign Requirements for Standby, Off Mode and Networked Standby Mode Electric Power Consumption Of Electrical And Electronic Household And Office Equipment (SGM: 2020/...) published in the Official Gazette ..... dated and numbered ... ,

e) 'Correlated colour temperature' (CCT [K]) means the temperature of a Planckian (black body) radiator whose perceived colour most closely resembles that of a given stimulus at the same brightness and under specified viewing conditions,



f) ‘connected separate control gear’ (CSCG) means a separate control gear including data-connection parts that are physically or functionally inseparable from the actual control gear parts to maintain the ‘reference control settings’ or separate control gear that can have physically integrated data-connection parts in a single inseparable housing, or the separate control gear that can be combined with physically separate data-connection parts placed on the market together with the control gear as a single product;

g) ‘Connected light source’ (CLS) means a light source including data-connection parts that are physically or functionally inseparable from the light emitting parts to maintain the ‘reference control settings’ or can be combined with physically separate data connectors supplied with the light source as a single product,

ğ) ‘Battery-operated’ means a product that operates only on direct current (DC) supplied from a source contained in the same product, without being connected directly or indirectly to the mains electricity supply,

h) “Declared values” means the values provided by the manufacturer, importer or authorised representative for the stated, calculated or measured technical parameters in accordance with Article 8 of this Communiqué, for the verification of compliance by the Ministry,

i) ‘On-mode power’ ( $P_{on}$ ), expressed in watt, means the electric power consumption of a light source in full-load with all lighting control parts and non-lighting parts disconnected if these parts cannot be disconnected, they are switched off or their power consumption are minimised following the manufacturer’s instructions, in case of a NMLS that requires a separate control gear to operate,  $P_{on}$  can be measured directly on the input to the light source, or  $P_{on}$  is determined using a control gear with known efficiency, whose electric power consumption is subsequently subtracted from the measured mains power input value,

i) ‘Survival factor’ (SF) means the defined fraction of the total number of light sources that continue to operate at a given time under defined conditions and switching frequency,

j) ‘Functionality after endurance testing’ means the functionality of a LED or OLED light source after endurance testing as defined in Annex V,

k) ‘Directional light source’ (DLS) means a light source having at least 80 % of total luminous flux within a solid angle of  $\pi$  sr (corresponding to a cone with angle of  $120^\circ$ ),

l) ‘Non-directional light source’ (NDLS) means a light source that is not a directional light source,

m) ‘Mains light source (MLS)’ means a light source that can be operated directly on the mains electricity supply, and can also be operated indirectly over the mains by using a separate control equipment,

n) ‘Non-mains light source (NMLS)’ means a light source that requires a separate control gear to operate on the mains,

o) ‘Useful luminous flux’ ( $\Phi_{use}$ ), means the part of the luminous flux of a light source that is considered when determining its energy efficiency,

1) For non-directional light sources it is the total flux emitted in a solid angle of  $4\pi$  sr (corresponding to a  $360^\circ$  sphere);

2) For directional light sources with beam angle  $\geq 90^\circ$  it is the flux emitted in a solid angle of  $\pi$  sr (corresponding to a cone with angle of  $120^\circ$ );

3) for directional light sources with beam angle  $< 90^\circ$  it is the flux emitted in a solid angle of  $0,586\pi$  sr (corresponding to a cone with angle of  $90^\circ$ ),

ö) 'G4', 'GY6.35' and 'G9' means an electrical interface of a light source consisting of two small pins at distances of 4, 6.35 and 9 mm respectively, as defined in standards,

p) 'G9.5', 'GX9.5', 'GY9.5', 'GZ9.5', 'GZX9.5', 'GZY9.5', 'GZZ9.5' 'G9.5HPL', 'G16', 'G16d', 'GX16d', 'GY16', 'G22', 'G38', 'GX38' and 'GX38Q' means an electrical interface of a light source consisting of two pins at distances of 9.5, 16, 22 and 38 mm respectively, as defined in standards, that 'G9.5HPL' includes a heatsink of specific dimensions as used on high-performance halogen lamps, and may include additional pins for grounding purposes,

r) 'Standby mode' means the condition of a light source or of a separate control gear, where it is connected to the power supply but the light source is intentionally not emitting light, and the light source or control gear is awaiting a control signal to return to a state with light emission, that lighting control parts enabling the standby function are in their control mode, non-lighting parts are disconnected or switched off or their power consumption are minimised following manufacturer's instructions,

s) 'Standby power' ( $P_{sb}$ ), expressed in watt, is the electric power consumption of a light source or of a separate control gear in standby mode,

ş) 'QXL (Quick eXchange Lamp)' means an electrical interface of a light source consisting, on the light source side, of two lateral tabs including the electrical contact surfaces and, on the opposite (rear) side, of a central protrusion allowing the light source to be grabbed with two fingers, that is specifically designed for use in a specific type of stage lighting luminaires, in which the light source is inserted from the rear of the luminaire using a one quarter turn rotation to fix or unfix it,

t) 'HL R7s' means a mains-voltage, double-capped, linear halogen light source with a cap diameter of 7 mm,

u) 'Photosensitive patients' means people with a specific condition causing photosensitive symptoms and who experience adverse reactions to natural and/or certain forms of artificial lighting technology,

ü) 'Flicker' means the perception of visual unsteadiness induced by a light stimulus, the luminance or spectral distribution of which fluctuates with time, for a static observer in a static environment, that the fluctuations can be periodic and non-periodic and may be induced by the light source itself, the power source or other influencing factors, that the metric is the parameter ' $P_{st} LM$ ', where 'st' stands for short term and 'LM' for light flickermeter method, as defined in standards, that a value  $P_{st} LM = 1$  means that the average observer has a 50 % probability of detecting flicker,

v) 'Luminance' (in a given direction, at a given point of a real or imaginary surface) means the luminous flux transmitted by an elementary beam passing through the given point and propagating in the solid angle containing the given direction divided by the area of a section of that beam containing the given point (cd/m<sup>2</sup>),

y) 'Luminous intensity' means the quotient of the luminous flux leaving the source and propagated in the element of solid angle containing a given direction, by the element of solid angle, expressed in candela or cd,

z) 'Beam angle' of a directional light source means the angle between two imaginary lines in a plane through the optical beam axis, such that these lines pass through the centre of the front face of the light source and through points at which the luminous intensity is 50 % of the centre beam intensity, where the centre beam intensity is the value of luminous intensity measured on the optical beam axis, for light sources that have different beam angles in different planes, the largest beam angle shall be the one taken into account, for light sources with user-controllable beam angle, the beam angle corresponding to the 'reference control setting' shall be the one taken into account,

aa) 'Second envelope' means a second outer envelope on an HID light source that is not required for the production of light, such as an external sleeve for preventing mercury and glass release into the environment in case of lamp breakage, that the HID arc tubes are not count as the envelope in determining the presence of the second envelope,

bb) 'K39d' means an electrical interface for a light source consisting of 2 wires with eyelets that can be fixed with screws,

cc) 'Compact fluorescent light source' (CFL) means a single-capped fluorescent light source with a bent-tube construction designed to fit in small spaces, that may be primarily spiral-shaped (i.e. curly forms) or primarily shaped as connected multiple parallel tubes, with or without a second bulb-like envelope, that are available with (CFLi) or without (CFLni) a physically integrated control gear,

çç) 'Control gear efficiency' the output power that supplies a light source divided by the input power of a separate control gear using the conditions and methods defined in standards, by disconnecting, switching off or setting to minimum power consumption any lighting control parts and non-lighting parts according to manufacturer's instructions and subtracting this power consumption from the overall input power,

dd) 'Control mode' means the condition of lighting control parts where they are connected to the light source and/or to the separate control gear and performing their functions in such a way that a control signal can be internally generated or a remotely initiated trigger can be received, by wire or wireless, and processed to lead to a change in the light emission of the light source or to a corresponding desired change in the power supply by the separate control gear,

ee) 'Control signal' means an analogue or digital signal transmitted to the light source or separate control gear wirelessly or wired either via voltage modulation in separate control cables or via a modulated signal in the supply voltage, that the signal transmission is not through a network but e.g. from an internal source or from a remote control delivered with the product,

ff) 'LFL T5-HE' means a high-efficiency linear fluorescent T5 light source with driving current lower than 0,2 A,

gg) 'LFL T5-HO' means a high-output linear fluorescent T5 light source with driving current higher than or equal to 0,2 A,

ğğ) 'LFL T8 2-foot', 'LFL T8 4-foot' or 'LFL T8 5-foot' means a linear T8 fluorescent light source with a length of approximately 600 mm (2 feet), 1 200 mm (4 feet) or 1 500 mm (5 feet) respectively, as defined in standards,

hh) 'Lumen maintenance factor' (XLMF) means the ratio of the luminous flux emitted by a light source at a given time in its life to the initial luminous flux,

ıı) 'Magnetic induction light source' means a light source using fluorescent technology, where energy is transferred to the gas discharge by means of an induced high-frequency magnetic field, instead of using electrodes placed inside the gas discharge, that the magnetic inductor can be external or internal to the shape of the discharge tube,

ii) 'Metal halide light source' (MH) means a high intensity discharge light source in which the light is produced by radiation from a mixture of metallic vapour, metal halides and the products of the dissociation of metal halides, that may have one ('single-ended') or two ('double-ended') connectors to their electricity supply, whose material for the arc tube can be quartz (QMH) or ceramic (CMH),

jj) 'Average luminance' (Luminance-HLLS) for a LED light source means the average luminance over a light-emitting area where the luminance is more than 50 % of the peak luminance (cd/mm<sup>2</sup>),

kk) 'Lifetime' for LED and OLED light sources means the time in hours between the start of their use and the moment when for 50 % of a population of light sources the light output has gradually degraded to a value below 70 % of the initial luminous flux, that is also referred to as the L70B50 lifetime,

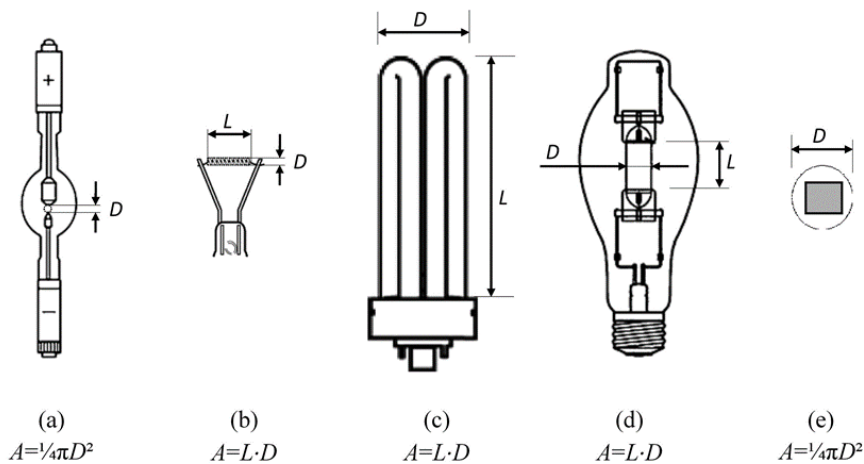
ll) 'Projected light-emitting surface area (A)' is the surface area in mm<sup>2</sup> (square millimetres) of the view in an orthographic projection of the light-emitting surface from the direction with the highest light intensity,

1) The light-emitting surface area is the surface area of the light source that emits light with the declared optical characteristics, such as the approximately spherical surface of an arc (a), cylindrical surface of a filament coil (b) or a gas discharge lamp (c, d), flat or semi-spherical envelope of a light-emitting diode (e).

2) For light sources with a non-clear envelope or with anti-glare shield, the light-emitting surface area is the entire area through which light leaves the light source.

3) For light sources containing more than one light emitter, the projection of the smallest gross volume enveloping all emitters shall be taken as the light-emitting surface.

4) For HID light sources definition (a) applies, unless the dimensions defined in (d) apply with  $L > D$ , where L is the distance between the electrode tips and D the inner diameter of the arc tube.



mm) ‘Specific effective radiant ultraviolet power’ (mW/klm) means the effective power of the ultraviolet radiation of a light source weighted according to the spectral correction factors and related to its luminous flux,

nn) ‘P28s’, ‘P40s’, ‘PGJX28’, ‘PGJX36’ and ‘PGJX50’ means an electrical interface of a light source that uses a flange contact to correctly position (pre-focus) the light source in a reflector, as defined in standards,

oo) ‘Reference control settings’ (RCS) means a control setting or a combination of control settings that is used to verify compliance of a light source with this Communique.

1) These settings are relevant for light sources that allow the end-user to control, manually or automatically, directly or remotely, the luminous intensity, colour, correlated colour temperature, spectrum, and/or beam angle of the emitted light,

2) In principle, the reference control settings shall be those predefined by the manufacturer as factory default values and encountered by the user at first installation (out-of-the-box values). If the installation procedure provides for an automatic software update during first installation, or if the user has the option to perform such an update, the resulting change in settings (if any) shall be taken into account.

3) If the out-of-the-box value is deliberately set differently from the reference control setting (e.g. at low power for safety purposes), the manufacturer shall indicate in the technical documentation how to recall the reference control settings for compliance verification and provide a technical justification why the out-of-the-box value is set differently from the reference control setting.

4) The light source manufacturer shall define the reference control settings such that:

(a) The light source is within the scope of this Communique according to Article 2 and none of the conditions for exemption applies;

(b) Lighting control parts and non-lighting parts are disconnected or switched-off or, in case this is not possible, the power consumption of these parts is minimal;

(c) The full-load condition is obtained;

(ç) When the end-user opts to reset factory defaults, the reference control settings are obtained.

5) For light sources that allow the manufacturer of a containing product to make implementation choices that influence light source characteristics (e.g. definition of the operating current(s); thermal design), and that cannot be controlled by the end-user, the reference control settings need not be defined. In that case the nominal test conditions as defined by the light source manufacturer apply,

öö) ‘Colour-tuneable light source’ (CTLS) means a light source that can be set to emit light with a large variety of colours outside the range defined in Article 5 but can also be set to emit white light inside the range defined in Article 5 for which the light source is within the scope of this Communiqué (Tuneable-white light sources that can only be set to emit light, with different correlated colour temperatures, within the range defined in Article 5, and dim-to-warm light sources that shift their white light output to lower correlated colour temperature when dimmed, simulating the behaviour of incandescent light sources, are not considered CTLS);

pp) ‘Colour consistency’ means the maximum deviation of the initial (after a short period of time), spatially averaged chromaticity coordinates (x and y) of a single light source from the chromaticity centre point (cx and cy) declared by the manufacturer or the importer, expressed as the size (in steps) of the MacAdam ellipse formed around the chromaticity centre point (cx and cy),

rr) ‘Stroboscopic effect’ means a change in motion perception induced by a light stimulus, the luminance or spectral distribution of which fluctuates with time, for a static observer in a non-static environment, that the fluctuations can be periodic and non-periodic and may be induced by the light source itself, the power source or other influencing factors that the metric for the stroboscopic effect is the ‘SVM’ (stroboscopic visibility measure), as defined in standards, that  $SVM = 1$  represents the visibility threshold for an average observer,

ss) ‘Non-clear envelope’ for an HID light source means a non-transparent outer envelope or outer tube in which the light producing arc tube is not visible,

§§) ‘T2’, ‘T5’, ‘T8’, ‘T9’ and ‘T12’ means a tubular light source with a diameter of approximately 7, 16, 26, 29 and 38 mm respectively, as defined in standards. The tube can be straight (linear) or bent (e.g. U-shaped, circular),

tt) ‘Full-load’ means the condition of a light source, within the declared operating conditions, in which it emits the maximum (undimmed) luminous flux; or the operating conditions and loads of the control gear under efficiency measurement as specified in the relevant standards,

uu) ‘Excitation purity’ means a percentage computed for a CTLS set to emit light of a certain colour, using a procedure further defined in standards, by drawing a straight line on an (x and y) colour space graph from a point with colour coordinates  $x = 0,333$  and  $y = 0,333$  (achromatic stimulus point), going through the point representing the (x and y) colour coordinates of the light source (point (2)), and ending on the outer border of the colour space (locus; point (3)) that is computed as the distance between points 1 and 2 divided by the distance between points 1 and 3, the full length of the line representing 100 % colour purity (point on the locus), the achromatic stimulus point representing 0 % colour purity (white light);

üü) ‘Remotely initiated trigger’ means a signal that comes from outside the light source or separate control gear via a network,

vv) ‘Data-connection parts’ means parts that perform any one of the following functions:

(a) reception or transmission of wired or wireless data signals and the processing thereof (used to control the light emission function and possibly otherwise);

(b) sensing and processing of the sensed signals (used to control the light emission function and possibly otherwise);

(c) a combination of these;

yy) ‘Anti-glare shield’ means a mechanical or optical reflective or non-reflective impervious baffle designed to block direct visible radiation emitted from the light emitter in a directional light source, in order to avoid temporary partial blindness (disability glare) if viewed directly by an observer, that does not include surface coating of the light emitter in the directional light source,

zz) ‘Displacement factor ( $\cos \phi_1$ )’ means the cosine of the phase angle  $\phi_1$  between the fundamental harmonic of the mains supply voltage and the fundamental harmonic of the mains current, that is used for mains light sources using LED- or OLED-technology, that is measured at full-load, for the reference control settings where applicable, with any lighting control parts in control mode and non-lighting parts disconnected, switched off or set to minimum power consumption according to the manufacturer’s instructions,

aaa) ‘High-pressure mercury light source’ means a high intensity discharge light source in which the major portion of light is produced, directly or indirectly, by radiation from predominantly vaporised mercury operating at a partial pressure in excess of 100 kilopascals,

bbb) ‘High-luminance light source’ (HLLS) means a LED light source with an average luminance greater than 30 cd/mm<sup>2</sup> in the direction of peak intensity,

ccc) ‘No-load mode’ means the condition of a separate control gear in which its input is connected to the mains power source and its output is intentionally disconnected from light sources, and, if applicable, from lighting control parts and non-lighting parts, if these parts cannot be disconnected, they shall be switched off and their power consumption shall be minimised following the manufacturer’s instructions, condition that only applies to a separate control gear for which the manufacturer or importer has declared in the technical documentation that it has been designed for this mode,

ççç) ‘No-load power’ ( $P_{no}$ ), expressed in watt, is the electric power consumption of a separate control gear in no-load mode,

## ECODESIGN REQUIREMENTS

For the purposes of compliance and verification of compliance with the requirements of this Communiqué, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the Official Journal of the European Union, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art.

### 1. ENERGY EFFICIENCY REQUIREMENTS:

(a) From 1 September 2021, the declared power consumption of a light source  $P_{on}$  shall not exceed the maximum allowed power  $P_{onmax}$  (in W), defined as a function of the declared useful luminous flux  $\Phi_{use}$  (in lm) and the declared colour rendering index CRI (-) as follows:

$$P_{onmax} = C \times (L + \Phi_{use} / (F \times \eta)) \times R$$

where:

— The values for threshold efficacy ( $\eta$  in lm/W) and end loss factor ( $L$  in W) are specified in Table 1, depending on the light source type. They are constants used for computations and do not reflect true parameters of light sources. The threshold efficacy is not the minimum required efficacy; the latter can be computed by dividing the useful luminous flux by the computed maximum allowed power.

— Basic values for correction factor ( $C$ ) depending on light source type, and additions to  $C$  for special light source features are specified in Table 2.

— Efficacy factor ( $F$ ) is:

- 1,00 for non-directional light sources (NDLS, using total flux)
- 0,85 for directional light sources (DLS, using flux in a cone)

— CRI factor ( $R$ ) is:

0,65 for  $CRI \leq 25$ ;

$(CRI+80)/160$  for  $CRI > 25$ , rounded to two decimals.

**Table 1**



### Threshold efficacy ( $\eta$ ) and end loss factor (L)

Light source description	$\eta$	L
	[lm/W]	[W]
LFL T5-HE	98.8	1.9
LFL T5-HO, $4.000 \leq \phi \leq 5.000$ lm	83.0	1.9
LFL T5-HO, other <i>lm</i> output	79.0	1.9
FL T5 circular	79.0	1.9
FL T8 (including FL T8 U-shaped)	89.7	4.5
From 1 September 2023, for FL T8 of 2-, 4- and 5-foot	120. 0	1.5
Magnetic induction light source, any length/flux	70.2	2.3
CFLni	70.2	2.3
FL T9 circular	71.5	6.2
HPS single-ended	88.0	50. 0
HPS double-ended	78.0	47. 7
MH $\leq 405$ W single-ended	84.5	7.7
MH $> 405$ W single-ended	79.3	12. 3
MH ceramic double-ended	84.5	7.7
MH quartz double-ended	79.3	12. 3
Organic light-emitting diode (OLED)	65.0	1.5
Until 1 September 2023: HL G9, G4 and GY6.35	19.5	7.7
HL R7s $\leq 2\ 700$ Lm	26.0	13. 0
Other light sources in scope not mentioned above	120. 0	1.5(*)
(*) For connected light sources (CLS) a factor L = 2,0 shall be applied.		

**Table 2**

### Correction factor C depending on light source characteristics

Light source type	Basic C value
Non-directional (NDLS) not operating on mains (NMLS)	1.00
Non-directional (NDLS) operating on mains (MLS)	1.08
Directional (DLS) not operating on mains (NMLS)	1.15
Directional (DLS) operating on mains (MLS)	1.23
Special light source feature	Bonus on C
FL or HID with CCT $> 5\ 000$ K	+0.10

FL with CRI > 90	0.10
HID with second envelope	+0.10
MH NDLS > 405 W with non-clear envelope	+0.10
DLS with anti-glare shield	+0.20
Colour-tuneable light source (CTLS)	+0.10
High luminance light sources (HLLS)	+0.0058 * Light HLLS – 0.0167

- 1) Where applicable, bonuses on correction factor C are cumulative.
  - 2) The bonus for HLLS shall not be combined with the basic C-value for DLS (basic C-value for NDLS shall be used for HLLS).
  - 3) Light sources that allow the end-user to adapt the spectrum and/or the beam angle of the emitted light, thus changing the values for useful luminous flux, colour rendering index (CRI) and/or correlated colour temperature (CCT), and/or changing the directional/non-directional status of the light source, shall be evaluated using the reference control settings.
  - 4) The standby power  $P_{sb}$  of a light source shall not exceed 0,5 W.
  - 5) The networked standby power  $P_{net}$  of a connected light source shall not exceed 0,5 W.
  - 6) The allowable values for  $P_{sb}$  and  $P_{net}$  shall not be added together.
- b) From 1 September 2021, the values set in Table 3 for the minimum energy efficiency requirements of a separate control gear operating at full-load shall apply:

**Table 3**  
**Minimum energy efficiency for separate control gear at full-load**

<b>Declared output power of the control gear (<math>P_{cg}</math>) or declared power of the light source (<math>P_{ls}</math>) in W, as applicable</b>	<b>Minimum energy efficiency</b>
<u>Control gear for HL light sources</u>  all wattages $P_{cg}$	0.91
<u>Control gear for FL light sources</u>  $P_{ls} \leq 5$  $5 < P_{ls} \leq 100$  $100 < P_{ls}$	0,71  $\frac{P_{ls}}{2} \times \sqrt{(P_{ls}/36) + 38/36 \times P_{ls} + 1}$  0,91
<u>Control gear for HID light sources</u>	

$P_{ls} \leq 30$	0.78
$30 < P_{ls} \leq 75$	0.85
$75 < P_{ls} \leq 105$	0.87
$105 < P_{ls} \leq 405$	0.90
$405 < P_{ls}$	0.92
<u>Control gear for LED or OLED light sources</u>	
all wattages $P_{cg}$	$P_{cg}^{0.81}/(1.09 \times P_{cg}^{0.81} + 2.10)$

1) Multi-wattage separate control gears shall comply with the requirements in Table 3 according to the maximum declared power on which they can operate.

2) The no-load power  $P_{no}$  of a separate control gear shall not exceed 0,5 W. This applies only to separate control gear for which the manufacturer or importer has declared in the technical documentation that it has been designed for no-load mode.

3) The standby power  $P_{sb}$  of a separate control gear shall not exceed 0,5 W.

4) The networked standby power  $P_{net}$  of a connected separate control gear shall not exceed 0,5 W. The allowable values for  $P_{sb}$  and  $P_{net}$  shall not be added together.

## 2. FUNCTIONAL REQUIREMENTS

a) From 1 September 2021, the functional requirements specified in Table 4 shall apply for light sources:

**Table 4**  
**Functional requirements for light sources**

Colour rendering	$CRI \geq 80$ (except for HID with $\Phi_{use} > 4$ klm and for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a $CRI < 80$ , when a clear indication to this effect is shown on the light source packaging and in all relevant printed and electronic documentation)
Displacement factor (DF, $\cos \varphi_1$ )	No limit at $P_{on} \leq 5$ W,

at power input $P_{on}$ for LED and OLED MLS	$DF \geq 0,5$ at $5\text{ W} < P_{on} \leq 10\text{ W}$ , $DF \geq 0,7$ at $10\text{ W} < P_{on} \leq 25\text{ W}$ $DF \geq 0,9$ at $25\text{ W} < P_{on}$
Lumen maintenance factor (for LED and OLED)	<p>The lumen maintenance factor <math>X_{LMF}\%</math> after endurance testing according to Annex V shall be at least <math>X_{LMF,MIN}\%</math> calculated as follows:</p> $X_{LMF,MIN}\% = 100 \times e^{\frac{(3000 \times \ln(0.7))}{L_{70}}}$ <p>where <math>L_{70}</math> is the declared <math>L_{70}B_{50}</math> lifetime (in hours)</p> <p>If the calculated value for <math>X_{LMF,MIN}</math> exceeds 96,0 %, an <math>X_{LMF,MIN}</math> value of 96,0 % shall be used</p>
Survival factor (for LED and OLED)	Light sources should be operational as specified in row ‘Survival factor (for LED and OLED)’ of Annex IV, Table 6, following the endurance testing given in Annex V.
Colour consistency for LED and OLED light sources	Variation of chromaticity coordinates within a six-step MacAdam ellipse or less.
Flicker for LED and OLED MLS	$P_{st} LM \leq 1.0$ at full-load
Stroboscopic effect for LED and OLED MLS	$SVM \leq 0,9$ at full-load (except for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a $CRI < 80$ ) From 1 September 2024: $SVM \leq 0,4$ at full-load (except for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a $CRI < 80$ )

### 3. INFORMATION REQUIREMENTS

From 1 September 2021 the following information requirements shall apply:

(1) Information to be displayed on the light source itself

a) For all light sources, except CTLS, LFL, CFLni, other FL, and HID, the value and physical unit of the useful luminous flux (lm) and correlated colour temperature (K) shall be displayed in a legible font on the surface if, after the inclusion of safety-related information, there is sufficient space available for it without unduly obstructing the light emission.

b) For directional light sources, the beam angle ( $^{\circ}$ ) shall also be indicated.

c) If there is room for only two values, the useful luminous flux and the correlated colour temperature shall be displayed. If there is room for only one value, the useful luminous flux shall be displayed.

(2) Information to be visibly displayed on the packaging

a) Light source placed on the market, not in a containing product

1) If a light source is placed on the market, not in a containing product, in a packaging containing information to be visibly displayed at a point-of-sale prior to its purchase, the following information shall be clearly and prominently displayed on the packaging:

(a) the useful luminous flux ( $\Phi_{\text{use}}$ ) in a font at least twice as large as the display of the on-mode power ( $P_{\text{on}}$ ), clearly indicating if it refers to the flux in a sphere ( $360^{\circ}$ ), in a wide cone ( $120^{\circ}$ ) or in a narrow cone ( $90^{\circ}$ );

(b) the correlated colour temperature, rounded to the nearest 100 K, also expressed graphically or in words, or the range of correlated colour temperatures that can be set;

(c) the beam angle in degrees (for directional light sources), or the range of beam angles that can be set;

(ç) electrical interface details, e.g. cap- or connector-type, type of power supply (e.g. 230 V AC 50 Hz, 12 V DC);

(d) the  $L_{70}B_{50}$  lifetime for LED and OLED light sources, expressed in hours;

(e) the on-mode power ( $P_{\text{on}}$ ), expressed in W;

(f) the standby power ( $P_{\text{sb}}$ ), expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging;

(g) the networked standby power ( $P_{\text{net}}$ ) for CLS, expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging;

(ğ) the colour rendering index, rounded to the nearest integer, or the range of CRI-values that can be set;

(h) if  $\text{CRI} < 80$ , and the light source is intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a  $\text{CRI} < 80$ , a clear indication to this effect. For HID light sources with useful luminous flux  $> 4\,000$  lm, this indication is not mandatory;

(i) if the light source is designed for optimum use in non-standard conditions (such as ambient temperature  $T_a \neq 25$  °C or specific thermal management is necessary): information on those conditions;

(i) a warning if the light source cannot be dimmed or can be dimmed only with specific dimmers or with specific wired or wireless dimming methods. In the latter cases a list of compatible dimmers and/or methods shall be provided on the manufacturer's website;

(j) if the light source contains mercury: a warning of this, including the mercury content in mg rounded to the first decimal place;

(k) if the light source is within the scope of Regulation on Control of Waste Electric Electronic Goods published in the Official Gazette dated 22/05/2012 and numbered 28300, without prejudice to marking obligations pursuant to that Regulation: a warning that it shall not be disposed of as unsorted municipal waste.

2) Items (a) to (c) shall be displayed on the packaging in the direction meant to face prospective buyer. For other items this is also recommended, if space permits.

3) For light sources that can be set to emit light with different characteristics, the information shall be reported for the reference control settings. In addition, a range of obtainable values may be indicated.

4) The information does not need to use the exact wording on the list above. Alternatively, it may be displayed in the form of graphs, drawings or symbols.

(b) Separate control gears:

1) If a separate control gear is placed on the market as a stand-alone product and not as a part of a containing product, in a packaging containing information to be visibly displayed to potential buyers, prior to their purchase, the following information shall be clearly and prominently displayed on the packaging:

a) the maximum output power of the control gear (for HL, LED and OLED) or the power of the light source for which the control gear is intended (for FL and HID).

b) the type of light source(s) for which it is intended.

c) the efficiency in full-load, expressed in percentage.

ç) the no-load power ( $P_{no}$ ), expressed in W and rounded to the second decimal, or the indication that the gear is not intended to operate in no-load mode. If the value is zero, it may be omitted from the packaging but shall nonetheless be declared in the technical documentation and on websites;

d) the standby power ( $P_{sb}$ ), expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging but shall nonetheless be declared in the technical documentation and on websites;

e) where applicable, the networked standby power ( $P_{net}$ ), expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging but shall nonetheless be declared in the technical documentation and on websites;

f) a warning if the control gear is not suitable for dimming of light sources or can be used only with specific types of dimmable light sources or using specific wired or wireless dimming methods. In the latter cases, detailed information on the conditions in which the control gear can be used for dimming shall be provided on the manufacturer's or importer's website;

g) a QR-code redirecting to a free-access website of the manufacturer, importer or authorised representative, or the internet address for such a website, where full information on the control gear can be found.

ğ) The information does not need to use the exact wording on the list above. Alternatively, it may be displayed in the form of graphs, drawings or symbols.

(3) Information to be visibly displayed on a free-access website of the manufacturer, importer or authorised representative

(1) Separate control gears;

1) For any separate control gear that is placed on the market, the following information shall be displayed on at least one free-access website:

(a) the information specified in point 3(b)(2), except 3(2)(b)(g);

(b) the outer dimensions in mm;

(c) the mass in grams of the control gear, without packaging, and without lighting control parts and non-lighting parts, if any and if they can be physically separated from the control gear;

(ç) instructions on how to remove lighting control parts and non-lighting parts, if any, or how to switch them off or minimise their power consumption during control-gear testing for market surveillance purposes;

(d) if the control gear can be used with dimmable light sources, a list of minimum characteristics that the light sources should have to be fully compatible with the control gear during dimming, and possibly a list of compatible dimmable light sources;

(e) recommendations on how to dispose of it at the end of its life in line with Regulation on Control of Waste Electric Electronic Goods;

(f) The information does not need to use the exact wording in the list above. Alternatively, it may be displayed in the form of graphs, drawings or symbols.

(4) Technical documentation

a) Separate control gears

1) The information specified in point 3(c)(1) of this Annex shall also be contained in the technical documentation file drawn up for the purposes of conformity assessment pursuant to Article 11 of Regulation on the Ecodesign of Energy Related Products (2009/125/EC).

(5) Information for products specified in point 4 of Annex III

a) For the light sources and separate control gears specified in point 4 of Annex III the intended purpose shall be stated in the technical documentation for compliance assessment as per Article 8 of this Communique and on all forms of packaging, product information and

advertisement, together with an explicit indication that the light source or separate control gear is not intended for use in other applications.

b) The technical documentation file drawn up for the purposes of conformity assessment, in accordance with Article 8 of this Communique shall list the technical parameters that make the product design specific to qualify for the exemption.

c) In particular for light sources indicated in point 4(m) of Annex III it shall be stated:  
'This light source is only for use by photo sensitive patients. Use of this light source will lead to increased energy cost compared to an equivalent more energy efficient product.'



**EXEMPTIONS**

1. This Communiqué shall not apply to light sources and separate control gears specifically tested and approved to operate:

a) in potentially explosive atmospheres, as defined in "Regulation on Equipment and Protective Systems Used in Potential Explosive Atmospheres (2014/34 / EU)" published in the Official Gazette dated 30/06/2016 and numbered 29758;

b) for emergency use, as set out in "Regulation on Electrical Equipment Designed for Certain Voltage Limits (2014/35 / EU)" published in the Official Gazette dated 2/10/2016 and numbered 29845;

c) in radiological and nuclear medicine installations that are subject to radiation safety standards as set out in "Regulation on Protection from Radiation in Nuclear Facilities" published in the Official Gazette dated 29/05/2018 and numbered 30435;

ç) in or on military or civil defence establishments, equipment, ground vehicles, marine equipment or aircraft;

d) in or on motor vehicles, their trailers and systems, interchangeable towed equipment, components and separate technical units as set out in "Type Approval Regulation on General Safety of Motor Vehicles and Trailers, Systems, Components and Separate Technical Units Designed for Them" published in the Official Gazette dated 25/1/2012 and numbered 28184 (661/2009 / EC), "Regulation on Type Approval and Market Surveillance and Inspection of Agricultural and Forestry Vehicles (EU / 167/2013)" published in the Official Gazette dated 14/08/2014 and numbered 29088 and "Regulation on the Type Approval and Market Surveillance and Inspection of Two- or Three-Wheel Motor Vehicles and Four-Wheel Motorcycles (EU / 168/2013)" published in the Official Gazette dated 22/08/2015 and numbered 29453,

e) in or on non-road mobile machinery and in or on their trailers;

f) in or on interchangeable equipment as set out in "Machinery Safety Regulation (2006/42 / AT)" published in the Official Gazette dated 03/03/2009 and numbered 27158 intended to be towed or to be mounted and fully raised from the ground or that cannot articulate around a vertical axis when the vehicle to which it is attached is in use on a road by vehicles as set out in "Regulation on Type Approval and Market Surveillance and Inspection of Agricultural and Forestry Vehicles (EU/167/2013)";

g) in or on civil aviation aircraft;

ğ) in railway vehicle lighting, as set out in "Railway Vehicles and Main Parts Type Approval Regulation" published in the Official Gazette dated 18/11/2015 and numbered 29536;

h) in marine equipment, as set out in "Marine Equipment Regulation" published in the Official Gazette dated 23/10/2005 and numbered 25975;

i) in medical devices, as set out in "Medical Device Regulation" published in the Official Gazette dated 07/06/2011 and numbered 27957 and in vitro medical devices as set out in "Regulation on Medical Diagnostic Devices Used Outside the Body (In Vitro)" published in the Official Gazette dated 09/01/2007 and numbered 26398.

2. For the purpose of this point, 'specifically tested and approved' means that the light source or separate control gear:

— has been specifically tested for the mentioned operating condition or application, according to the legislation mentioned or related implementing measures, or relevant national or international standards, or, in the absence of these, according to relevant EU Member States legislation; and

— is accompanied by evidence, to be included in the technical documentation, in the form of a certificate, a type approval mark, a test report, that the product has been specifically approved for the mentioned operating condition or application; and

— is placed on the market specifically for the mentioned operating condition or application, as evidenced at least by the technical documentation, and except for point (ç), information on the packaging and any advertising or marketing materials.

3. In addition, this Communiqué shall not apply to:

a) Double-capped fluorescent T5 light sources with power  $P \leq 13$  W;

b) Electronic displays (e.g. televisions, computer monitors, notebooks, tablets, mobile phones, e-readers, game consoles), including but not limited to displays within the scope of "Communique on Ecodesign Requirements of Electronic Displays (2019/2021/EU) (SGM: 2020 /...)" published in the Official Gazette dated... /... /... and numbered.... and "Communique on Ecodesign Requirements for Computers (617/2013 / EU) (SGM: 2020 /...)" published in the Official Gazette dated... /... /... and numbered.... ;

c) Light sources and separate control gears in battery-operated products, including but not limited to e.g. torches, mobile phones with an integrated torch light, toys including light sources, desk lamps operating only on batteries, armband lamps for cyclists, solar-powered garden lamps;

ç) Light sources for spectroscopy and photometric applications, such as for example UV-VIS spectroscopy, molecular spectroscopy, atomic absorption spectroscopy, nondispersive infrared (NDIR), fourier-transform infrared (FTIR), medical analysis, ellipsometry, layer thickness measurement, process monitoring or environmental monitoring;

d) light sources and separate control gears on bicycles and other non-motorised vehicles.

4. Any light source or separate control gear within the scope of this Communiqué shall be exempt from the requirements of this Communiqué, with the exception of the information requirements set out in point 3(6) of Annex II, if they are specifically designed and marketed for their intended use in at least one of the following applications:

a) Signalling (including, but not limited to, road-, railway-, marine- or air traffic- signalling, traffic control or airfield lamps);

b) Image capture and image projection (including, but not limited to, photocopying, printing (directly or in pre-processing), lithography, film and video projection, holography);

c) Light sources with specific effective ultraviolet power > 2 mW/klm and intended for use in applications requiring high UV-content;

ç) Light sources with a peak radiation around 253,7 nm and intended for germicidal use (destruction of DNA)

d) Light sources emitting 5 % or more of total radiation power of the range 250-800 nm in the range of 250-315 nm and/or 20 % or more of total radiation power of the range 250-800 nm in the range of 315-400 nm, and intended for disinfection or fly trapping;

e) Light sources with the primary purpose of emitting radiation around 185,1 nm and intended to be used for the generation of ozone;

f) Light sources emitting 40 % or more of total radiation power of the range 250-800 nm in the range of 400-480 nm, and intended for coral zooxanthellae symbioses;

g) FL light sources emitting 80 % or more of total radiation power of the range 250-800 nm in the range of 250-400 nm, and intended for sun-tanning;

ğ) HID light sources emitting 40 % or more of total radiation power of the range 250-800 nm in the range of 250-400 nm, and intended for sun-tanning;

h) Light sources with a photosynthetic efficacy > 1,2 µmol/J, and/or emitting 25 % or more of total radiation power of the range 250-800 nm in the range of 700-800 nm, and intended for use in horticulture;

ı) HID light sources with correlated colour temperature CCT > 7 000 K and intended for use in applications requiring such a high CCT;

i) Light sources with a beam angle of less than 10° and intended for spot-lighting applications requiring a very narrow light beam;

j) Halogen light sources with cap-type G9.5, GX9.5, GY9.5, GZ9.5, GZX9.5, GZY9.5, GZZ9.5, K39d, G9.5HPL, G16d, GES/E40 (low voltage (24V) silver crown only), GX16, GX16d, GY16, G22, G38, GX38, GX38Q, P28s, P40s, PGJX28, PGJX 36, PGJX50, R7s with a luminous flux > 12 000 lm, QXL, designed and marketed specifically for scene-lighting use in film studios, TV studios, and photographic studios, or for stage-lighting use in theatres, discos and during concerts or other entertainment events;

k) Colour-tuneable light sources that can be set to at least the colours listed in this point and which have for each of these colours, measured at the dominant wavelength, a minimum excitation purity indicated below and are intended for use in applications requiring high-quality coloured light;

Blue	440nm – 490nm	%90
Green	520nm – 570nm	%65
Red	610nm – 670nm	%95

l) Light sources accompanied by an individual calibration certificate detailing the exact radiometric flux and/or spectrum under specified conditions, and intended for use in photometric calibration (of e.g. wavelength, flux, colour temperature, colour rendering index), or for laboratory use or quality control applications for the evaluation of coloured surfaces and materials under standard viewing conditions (e.g. standard illuminants);

m) Light sources provided specifically for use by photosensitive patients, to be sold in pharmacies and other authorised selling points (e.g. suppliers of disability products), upon presentation of a medical prescription;

n) Incandescent light sources (not including halogen light sources) fulfilling all of the following conditions: power  $\leq 40$  W, length  $\leq 60$  mm, diameter  $\leq 30$  mm, declared suitable for operation at ambient temperature  $\geq 300$  °C, and intended for use in high temperature applications such as ovens;

o) Halogen light sources fulfilling all of the following conditions: cap-type G4, GY6.35 or G9, power  $\leq 60$  W, declared suitable for operation at ambient temperature  $\geq 300$  °C, and intended for use in high temperature applications such as ovens;

ö) Incandescent light sources with blade contact-, metal lug-, cable-, litz wire-, metric thread-, pin base- or non-standard customised electrical interface, encasing made from quartz-glass tubes, specifically designed and exclusively marketed for industrial or professional electro-heating equipment (such as stretch blow-moulding process in PET-Industry, 3D-printing, photovoltaic and electronic manufacturing processes, drying or hardening of adhesives, inks, paints or coatings);

p) Halogen light sources fulfilling all of the following conditions: R7s cap, CCT  $\leq 2\ 500$  K, length not in the ranges 75-80 mm and 110-120 mm, specifically designed and marketed for industrial or professional electro-heating equipment (e.g. stretch blow-moulding process in PET-Industry, 3D-printing, gluing, inks, paint and coating hardening);

r) Single capped fluorescent lamps (CFLni) having a diameter of 16 mm (T5), 2G11 4 pin base, with CCT = 3 200 K and chromaticity coordinates  $x = 0,415$   $y = 0,377$ , or with CCT = 5 500 K and chromaticity coordinates  $x = 0,330$   $y = 0,335$ , specifically designed and marketed for studio and video applications for traditional filmmaking;

s) Within the scope of the Law on Intellectual and Artistic Works No. 5846, LED or OLED light sources made by the artist him/herself in a limited number below 10 pieces;

ş) light sources that

1) are specifically designed and exclusively marketed for scene-lighting use in film-studios, TV-studios and locations, and photographic-studios and locations, or for stage-lighting use in theatres, during concerts or other entertainment events;

and that:

2) Meet at least one of the following specifications:

(a) LED with power  $\geq 100$  W and CRI  $> 90$ ;

(b) GES/E40, K39d socket with changeable Colour Temperature down to 1 800 K (undimmed), used with low voltage power supply;

(c) LED with power  $\geq 180$  W and arranged to direct output to an area smaller than the light emitting surface;

(ç) Incandescent light source that is DWE type and has 650 W power, 120 V voltage and pressure screw terminal;

(d) LED with power  $\geq 100$  W that allows the user to set different correlated colour temperatures for the emitted light;

(e) LFL T5 with G5 cap with CRI  $\geq 85$  and CCT 2 900, 3 000, 3 200, 5 600 or 6 500 K

t) incandescent DLS fulfilling all of the following conditions: E27 cap, clear envelope, power  $\geq 100$  W and  $\leq 400$  W, CCT  $\leq 2 500$  K, specifically designed and exclusively marketed for infrared heating.

5. CLS and CSCG designed and marketed specifically for scene-lighting use in film-studios, TV-studios and locations, and photographic studios and locations, or for stage-lighting use in theatres, discos and during concerts or other entertainment events, for connection to high speed control networks (utilising signalling rates of 250 000 bits per second and higher) in always-listening mode, shall be exempt from the requirements on standby (Psb) and on networked standby (Pnet) of points 1(a) and 1(b) of Annex II.

6. Light sources specifically designed and exclusively marketed for use in products in the scope of *Communique on Ecodesign Requirements For Household Washing Machines And Household Washer-Dryers (2019/2023/EU) (SGM: 2021/3)* published in the Official Gazette dated... and numbered..., *Communique on Ecodesign Requirements of Household Dishwashers (2019/2022 / EU) (SGM: 2021/1)* published in the Official Gazette dated... and numbered..., *Communique on Ecodesign Requirements for Household Tumble Dryers (SGM-2013/2)* published in the Official Gazette dated 17/7/2013 and numbered 28710 and *Communique on Ecodesign Requirements for Refrigerating Appliances (2019/2019/EU) (SGM: 2021/7)* published in the Official Gazette dated... and numbered..., shall be exempt from the requirements regarding lumen maintenance factor and survival factor set out in Table 4 of Annex II, and from the lifetime information requirement set out in point 3(2)(a)(1)(d) of Annex II.

## VERIFICATION PROCEDURE FOR MARKET SURVEILLANCE PURPOSES

1. The verification tolerances defined in this Annex relate only to the verification by Ministry of the declared values and shall not be used by the manufacturer, importer or authorised representative as an allowed tolerance to establish the values in the technical documentation or in interpreting these values with a view to achieving compliance or to communicate better performance by any means.

2. Where a model has been designed to be able to detect it is being tested (e.g. by recognising the test conditions or test cycle), and to react specifically by automatically altering its performance during the test with the objective of reaching a more favourable level for any of the parameters specified in this Communique or included in the technical documentation or included in any of the documentation provided, the model and all equivalent models shall be considered not compliant.

3. As part of verifying the compliance of a product model with the requirements laid down in this Communique pursuant to Article 5(2) of Regulation on Ecodesign of Energy Related Products (2009/125/EC) published in the Official Gazette dated 07/10/2010 and numbered 27722, the Ministry shall apply the following procedure:

a) The Ministry shall verify one single unit of the model for points c(1), c(2), c(4) and c(5) of this Annex.

b) The Ministry shall verify 10 units of the light source model or 3 units of the separate control gear model. The verification tolerances are laid down in Table 6.

c) The model shall be considered to comply with the applicable requirements if:

1) The values given in the technical documentation pursuant to point 2 of Annex IV to Regulation on Ecodesign of Energy Related Products (2009/125/EC) (declared values), and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to paragraph (f) thereof; and

2) The declared values meet any requirements laid down in this Communique, and any required product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values and;

3) When the Ministry tests the units of the model, the determined values comply with the respective verification tolerances as given in Table 6 of this Annex, where “determined value” means the arithmetic mean over the tested units of the measured values for a given parameter or the arithmetic mean of parameter values calculated from measured values and;

4) When the Ministry checks the unit of the model, they find that the manufacturer, importer or authorised representative has put in place a system that complies with the requirements in the second paragraph of Article 10 and;

5) When the Ministry checks the unit of the model, it complies with the requirement in the third point of Article 10 and the information requirements in point 3 of Annex II.

ç) If the results referred to in first, second, third fourth and fifth points of this article are not achieved, the model and all equivalent models shall be considered not to comply with this Communiqué.

d) The Ministry shall provide all relevant information to the authorities of the other Member States and to the Commission without delay after a decision being taken on the non-compliance of the model according to point 3(ç) or the article 2 of this Annex.

4. The Ministry shall only apply the verification tolerances that are set out in Table 6 and shall use only the procedure described in this Annex. For the parameters in Table 6, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 6

**Verification tolerances**

<b>Parameter</b>	<b>Sample size</b>	<b>Verification tolerances</b>
<b>Full-load on-mode power <math>P_{on}</math> [W]:</b>		
$P_{on} \leq 2W$	10	The determined value shall not exceed the declared value by more than 0,20 W.
$2W < P_{on} \leq 5W$	10	The determined value shall not exceed the declared value by more than 10 %.
$5W < P_{on} \leq 25W$	10	The determined value shall not exceed the declared value by more than 5 %.
$25W < P_{on} \leq 100W$	10	The determined value shall not exceed the declared value by more than 5 %.
$100W < P_{on}$	10	The determined value shall not exceed the declared value by more than 2,5 %.
<b>Displacement factor [0-1]</b>	10	The determined value shall not be less than the declared value minus 0,1 units.
<b>Useful luminous flux <math>\Phi_{use}</math> [lm]</b>	10	The determined value shall not be less than the declared value minus 10 %.
<b>No-load power <math>P_{no}</math>, Standby power <math>P_{sb}</math> and Networked standby power <math>P_{net}</math> [W]</b>	10	The determined value shall not exceed the declared value by more than 0,10 W.
<b>CRI [0-100]</b>	10	The determined value shall not be less than the declared value by more than 2,0 units.

<b>Flicker [<math>P_{st}</math> LM] and stroboscopic effect [SVM]</b>	10	The determined value shall not exceed the declared value by more than 0,1.
<b>Colour consistency [MacAdam ellips steps]</b>	10	The determined number of steps shall not exceed the declared number of steps. The centre of the MacAdam ellipse shall be the centre declared by the supplier with a tolerance of 0,005 units.
<b>Beam angle (degrees)</b>	10	The determined value shall not deviate from the declared value by more than 25 %.
<b>Control gear efficiency [0-1]</b>	3	The determined value shall not be less than the declared value minus 0,05 units.
<b>Lumen maintenance factor (for LED and OLED)</b>	10	The determined $X_{LMF}\%$ of the sample following the test in Annex V of this Communiqué shall not be less than $X_{LMF, MIN}\%$ <sup>(1)</sup> .
<b>Survival factor (for LED and OLED)</b>	10	At least 9 light sources of the test sample must be operational after completing the test in Annex V of this Communiqué.
<b>Excitation purity [%]</b>	10	The determined value shall not be less than the declared value minus 5 %.
<b>Correlated colour temperature [K]</b>	10	The determined value shall not deviate from the declared value by more than 10 %.
<sup>(1)</sup> There is no tolerance associated with this metric, as it is a fixed requirement and it is up to the manufacturer to declare an $L_{70}B_{50}$ value to meet it.		

5. For light sources with linear geometry which are scalable but of very long length, such as LED strips or strings, verification testing of market surveillance authorities shall consider a length of 50 cm, or, if the light source is not scalable there, the nearest value to 50 cm. The light source manufacturer or importer shall indicate which separate control gear is suitable for this length.

6. When verifying if a product is a light source, market surveillance authorities shall compare the measured values for chromaticity coordinates (x and y), luminous flux, luminous flux density, and colour rendering index directly with the limit values set out in the definition for light source of Article 5 of this Communiqué, without applying any tolerances. If any of the 10 units in the sample satisfies the conditions for being a light source, the product model shall be considered to be a light source.



7. Light sources that allow the end-user to control, manually or automatically, directly or remotely, the luminous intensity, colour, correlated colour temperature, spectrum, and/or beam angle of the emitted light shall be evaluated using the reference control settings.

## FUNCTIONALITY AFTER ENDURANCE TESTING

1. Models of LED and OLED light sources shall undergo endurance testing to verify their lumen maintenance and survival factor. This endurance testing consists of the test method outlined below. The Ministry shall test 10 units of the model for this test.

2. The endurance test for LED and OLED light sources shall be conducted as follows:

a) Ambient conditions and test setup:

1) The switching cycles are to be conducted in a room with an ambient temperature of  $25 \pm 10$  °C and an average air velocity of less than 0,2 m/s.

2) The switching cycles on the sample shall be conducted in free air in a vertical base-up position. However, if a manufacturer or importer has declared the light source suitable for use in a specific orientation only, then the sample shall be mounted in that orientation.

3) The applied voltage during the switching cycles shall have a tolerance within 2 %. The total harmonic content of the supply voltage shall not exceed 3 %. Standards provide guidance on the supply voltage source. Light sources designed to be operated on mains voltage shall be tested at 230 V, 50 Hz supply, even if the products are able to be operated on variable supply conditions.

b) Endurance test method:

1) Initial flux measurement: measure the luminous flux of the light source prior to starting the endurance test switching cycle.

2) Switching cycles: operate the light source for 1 200 cycles of repeated, continuous switching cycles without interruption. One complete switching cycle consists of 150 minutes of the light source switched ON at full power followed by 30 minutes of the light source switched OFF. The hours of operation recorded (i.e. 3 000 hours) include only the periods of the switching cycle when the light source was switched ON, i.e. the total test time is 3 600 hours.

3) Final flux measurement: at the end of the 1 200 switching cycles, note if any light sources have failed (see 'Survival factor' in Annex IV, Table 6) and measure the luminous flux of the light sources that have not failed.

4) For each of the units in the sample which have not failed, divide the measured final flux by the measured initial flux. Average the resulting values over all the units that did not fail to compute the determined value for the lumen maintenance factor XLMF %.

## BENCHMARKS

1. For the environmental aspects that were considered significant and are quantifiable, the best available technology on the market, at the time of entry into force of this Communique, is indicated below.

2. The best available technology on the market for light sources in terms of their efficacy based on useful luminous flux was identified as follows:

- Mains voltage non-directional light sources: 120-140 lm/W
- Mains voltage directional light sources: 90-100 lm/W
- Directional light sources not operating on the mains: 85- 95 lm/W
- Linear light sources (tubes): 140-160 lm/W

3. The best available technology on the market for separate control gears has an energy efficiency of 95 %.

4. Features required in certain applications (e.g. a high colour rendering), might prevent products offering those features from achieving these benchmarks.

5. The best available technology on the market for light sources and separate control gears do not have any mercury content.