

*Draft Regulations laid before Parliament under regulation 24(1)(b) of the Ecodesign for Energy-Related Products Regulations 2010 and Article 11A(2)(b) of Regulation (EU) 2017/1369 of the European Parliament and of the Council setting a framework for energy labelling, for approval by resolution of each House of Parliament.*

---

D R A F T   S T A T U T O R Y   I N S T R U M E N T S

---

**2021 No. XXX**

**ENERGY CONSERVATION**

**The Ecodesign for Energy-Related Products and Energy  
Information (Lighting Products) Regulations 2021**

*Made* - - - - **\*\*\***  
*Coming into force* - - *1st September 2021*

The Secretary of State makes these Regulations in exercise of the powers conferred by regulations 22 and 24(2) of the Ecodesign for Energy-Related Products Regulations 2010(a) (“the 2010 Regulations”) and Articles 11 and 11A(3) of Regulation (EU) 2017/1369 of the European Parliament and of the Council setting a framework for energy labelling(b) (“the Framework Regulation”).

A draft of this instrument was laid before Parliament in accordance with regulation 24(1)(b) of the 2010 Regulations and Article 11A(2)(b) of the Framework Regulation, and approved by a resolution of each House of Parliament.

For the purposes of paragraph (1) of regulation 22 of the 2010 Regulations, the Secretary of State considers that the matters set out in paragraphs (2) and (6) are satisfied. The Secretary of State has complied with paragraph (4) of regulation 22 of those Regulations.

For the purposes of paragraph (1) of Article 11 of the Framework Regulation, the Secretary of State considers that the conditions set out in paragraph (1)(a) to (d) are satisfied. The Secretary of State has complied with paragraph (2) of Article 11 of that Regulation.

**CONTENTS**

**PART 1**

**INTRODUCTION**

1. Citation, commencement and extent

---

(a) S.I. 2010/2617, amended by S.I. 2011/2677, S.I. 2012/3005, S.I. 2013/1232, S.I. 2014/1290, S.I. 2015/469, S.I. 2016/838, S.I. 2017/1143, S.I. 2019/539, S.I. 2019/1253 and S.I. 2020/485. [need to update this when EU Exit SI No.2 is made]  
(b) EUR 2017/1369, amended by S.I. 2019/539 and [need to update this when EU Exit SI No.2 is made] .

2. Interpretation

PART 2  
ECODESIGN AND ENERGY LABELLING FOR LIGHT SOURCES AND SEPARATE  
CONTROL GEARS

CHAPTER 1

GENERAL

3. Interpretation

CHAPTER 2

ECODESIGN FOR LIGHT SOURCES AND SEPARATE CONTROL GEARS

4. Application
5. Ecodesign requirements
6. Removal of light sources and separate control gears
7. Conformity assessment
8. Verification procedure for market surveillance purposes
9. Measurements and calculations

CHAPTER 3

ENERGY LABELLING OF LIGHT SOURCES

10. Application
11. Obligations of suppliers
12. Obligations of dealers
13. Obligations of internet hosting platforms
14. Measurements and calculations
15. Verification procedure for market surveillance purposes

PART 3

GENERAL

16. Review
17. Revocations
18. Amendment of the Ecodesign for Energy-Related Products Regulations 2010
19. Amendment of the Energy Information Regulations 2011

- 
- SCHEDULE 1 — Interpretation of the Schedules
- SCHEDULE 2 — Ecodesign requirements for light sources and separate control gears
- SCHEDULE 3 — Exemptions
- SCHEDULE 4 — Verification procedure for market surveillance purposes
- SCHEDULE 5 — Functionality after endurance testing
- SCHEDULE 6 — Energy labelling of light sources – energy efficiency classes and calculation method
- SCHEDULE 7 — Labels for light sources
- SCHEDULE 8 — Exemptions
- SCHEDULE 9 — Product information
- SCHEDULE 10 — Technical documentation

- SCHEDULE 11 — Information to be provided in visual advertisements, technical promotional material, and in distance selling except distance selling on the internet
- SCHEDULE 12 — Information to be provided in the case of distance selling through the internet
- SCHEDULE 13 — Verification procedure for market surveillance purposes

## PART 1

### INTRODUCTION

#### Citation, commencement and extent

- 1.—(1) These Regulations may be cited as the Ecodesign for Energy-Related Products and Energy Information (Lighting Products) Regulations 2021.
- (2) These Regulations come into force on 1st September 2021.
- (3) These Regulations extend to England and Wales, and Scotland.

#### Interpretation

- 2.—(1) In these Regulations—
- “the 2010 Regulations” means the Ecodesign for Energy-Related Products Regulations 2010;
- “the Framework Regulation” means Regulation (EU) 2017/1369 of the European Parliament and of the Council setting a framework for energy labelling.

## PART 2

### ECODESIGN AND ENERGY LABELLING FOR LIGHT SOURCES AND SEPARATE CONTROL GEARS

#### CHAPTER 1

##### GENERAL

#### Interpretation

##### *Meaning of “light source”*

- 3.—(1) In this Part “light source” means, subject to paragraph (5)—
- (a) an electrically operated product intended to emit light; or
  - (b) a non-incandescent light source, intended to be possibly tuned to emit light; or
  - (c) both of the above,
- which has the optical characteristics specified in paragraph (2) and meets the conditions specified in paragraph (3).
- (2) The optical characteristics referred to in paragraph (1) are—
- (a) subject to paragraph (6), chromaticity coordinates  $x$  and  $y$  in the range—  
 $0.270 < x < 0.530$  and  
 $-2.3172 x^2 + 2.3653 x - 0.2199 < y < -2.3172 x^2 + 2.3653 x - 0.1595$ ;
  - (b) a luminous flux  $< 500$  lumen per  $\text{mm}^2$  of projected light-emitting surface area as defined in Schedule 1;
  - (c) a luminous flux between 60 and 82,000 lumen; and

- (d) a colour rendering index (CRI) > 0.
- (3) The conditions referred to in paragraph (1) are that the product or source—
  - (a) uses incandescence, fluorescence, high-intensity discharge, LED or OLED, or any combinations of these, as lighting technology; and
  - (b) can be verified as a light source according to the procedure in Schedule 4.
- (4) For the purposes of this Part “light source” does 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;
  - (d) light-emitting parts contained in a light source from which these parts cannot be removed for verification as a light source.
- (5) High-pressure sodium (HPS) light sources are not required to meet the characteristic in paragraph (3)(a) to be classed as light sources for the purposes of this Part.
- (6) Where a containing product cannot be taken apart for verification of the light source or separate control gear, the entire containing product is to be classed as a light source for the purposes of this Part.
- (7) A light-emitting device which is intended to be used directly in an LED luminaire is to be classed as a light source for the purposes of this Part.

*Meaning of “control gear”*

- (8) In this Part “control gear” means, subject to paragraph (10), one or more devices which—
  - (a) may or may not be physically integrated in a light source; and
  - (b) is 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.
- (9) The function of a control gear may include any of the following—
  - (a) transforming the supply and starting voltage
  - (b) limiting operational and preheating current;
  - (c) preventing cold starting;
  - (d) correcting the power factor;
  - (e) reducing radio interference.
- (10) For the purposes of this Part “control gear” does not include—
  - (a) power supplies within the scope of Commission Regulation (EU) 2019/1782 ;
  - (b) lighting control parts and non-lighting parts (as defined in Schedule 1), although such parts may be physically integrated with a control gear or marketed together as a single product;
  - (c) equipment for power supply and data handling which is installed between the mains and office equipment and/or light sources for the purpose of data transfer and power supply.

*Interpretation of other terms*

- (11) In this Part—
  - “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;
  - “containing product” means a product containing—
    - (a) one or more light sources; or
    - (b) separate control gears; or
    - (c) both;

and includes luminaires that can be taken apart to allow separate verification of the contained light source, household appliances containing light sources, and furniture containing light sources (for example display cabinets).

“light” means electromagnetic radiation with a wavelength between 380 nm and 780 nm;

“mains” or “mains voltage”(MV) means the electricity supply of 230 ( $\pm$  10%) volt of alternating current at 50 Hz;

“LED die” or “LED chip” means a small block of light-emitting semiconducting material on which a functional LED circuit is fabricated;

“LED package”—

- (a) means a single electric part comprising principally at least one LED die;
- (b) does not include a control gear or parts of a control gear, a cap or active electronic components;
- (c) is not connected directly to the mains voltage;
- (d) may include one or more of the following—
  - (i) optical elements;
  - (ii) light converters (phosphors);
  - (iii) thermal, mechanical and electric interfaces; or
  - (iv) parts to address electrostatic discharge concerns;

“chromaticity” means the property of a colour stimulus defined by its chromaticity coordinates (x and y);

“luminous flux” or “flux” ( $\Phi$ ), expressed in lumen (lm)—

- (a) means the quantity derived from radiant flux (radiant power) by evaluating the electromagnetic radiation in accordance with the spectral sensitivity of the human eye;
- (b) refers to the total flux emitted by a light source in a solid angle of  $4\pi$  steradians under conditions (for example current, voltage, temperature) specified in applicable standards;
- (c) refers to the initial flux for the undimmed light source after a short operating period, unless it is clearly specified that the flux in a dimmed condition or the flux after a given period of operation is intended;
- (d) for light sources that can be tuned to emit different light spectra or different maximum light intensities, refers to the flux in the ‘reference control settings’ as defined in Schedule 1;

colour rendering index” (CRI)—

- (a) 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
- (b) is the average Ra of the colour rendering for the first 8 test colours (R1-R8) defined in standards;

“incandescence” means the phenomenon where light is produced from heat, in light sources it is typically produced through a threadlike conductor (“filament”) which is heated by the passage of an electric current;

“halogen light source” means an incandescent light source with a threadlike conductor made from tungsten surrounded by gas containing halogens or halogen compounds;

“fluorescence” or “fluorescent light source” (FL)—

- (a) means the phenomenon or a light source which uses 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;
- (b) may have one (“single-capped”) or two (“double-capped”) connections (“caps”) to their electricity supply;

(c) includes magnetic induction light sources;

“high intensity discharge” (HID) means an electric gas discharge in which—

(a) the light-producing arc is stabilised by wall temperature; and

(b) the arc chamber has a bulb wall loading in excess of 3 watts per square centimetre;

“HID light sources” means—

(a) metal halide;

(b) high-pressure sodium; and

(c) mercury vapour;

types of light source, as defined in Schedule 1;

“gas discharge” means a phenomenon where light is produced, directly or indirectly, by an electric discharge through a gas, plasma, metal vapour or a mixture of gases and vapours;

“LED” refers to inorganic light emitting diodes, and means a technology in which—

(a) light is produced from a solid state device embodying a p-n junction of inorganic material; and

(b) the junction emits optical radiation when excited by an electric current;

“OLED” refers to organic light emitting diodes, and means a technology in which—

(a) light is produced from a solid state device embodying a p-n junction of organic material; and

(b) the junction emits optical radiation when excited by an electric current;

“high-pressure sodium light source” (HPS)—

(c) means a high intensity discharge light source in which the light is produced mainly by radiation from sodium vapour operating at a partial pressure of the order of 10 kilopascals;

(d) may have one (“single-ended”) or two (“double-ended”) connectors to their electricity supply;

“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;

“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;

“end-user” means a natural person buying or expected to buy a product for purposes which are outside their trade, business, craft or profession;

“point of sale” means a physical location where the product is displayed or offered for sale, hire or hire-purchase to the customer.

(12) Further terms are defined in Schedule 1.

## CHAPTER 2

### ECODESIGN FOR LIGHT SOURCES AND SEPARATE CONTROL GEARS

#### Application

4.—(1) Subject to paragraph (2), this Chapter applies to—

(a) light sources; and

(b) separate control gears;

including light sources and separate control gears placed on the market in a containing product.

(2) Schedule 3 specifies exemptions from this Chapter.

## **Ecodesign requirements**

5. Any light source or control gear to which these Regulations applies that is placed on the market or put into service after 1 September 2021 must conform to the ecodesign requirements set out in Schedule 2.

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

6.—(1) Manufacturers, authorised representatives or importers of containing products must ensure that light sources and separate control gears can be replaced with the use of commonly available tools and without permanent damage to the containing product.

(2) Paragraph (1) does not apply where a technical justification related to the functionality of the containing product is provided in the technical documentation<sup>(a)</sup> explaining why the replacement of light sources and separate control gear is not appropriate.

(3) The technical documentation must provide instructions on how light sources and separate control gears can be removed without being permanently damaged for verification purposes by the market surveillance authority.

(4) Manufacturers, authorised representatives or importers of containing products must provide information about the replaceability or non-replaceability of light sources and control gears by—

- (a) end-users; or
- (b) qualified repairers;

without permanent damage to the containing product.

(5) The information referred to in paragraph (4) must be—

- (a) available on a website which is accessible to the public without charge; and
- (b) for products sold directly to end-users—
  - (i) on the packaging, at least in the form of a pictogram; and
  - (ii) in the user instructions.

(6) Manufacturers, authorised representatives or importers of containing products must ensure that—

- (a) light sources and separate control gears can be dismantled from containing products at end of life; and
- (b) dismantling instructions are available on a website which is accessible to the public without charge.

## **Conformity assessment**

7.—(1) For the purposes of the assessment referred to in regulation 4(2)(a) of the 2010 Regulations, a manufacturer, importer or authorised representative assessing whether a product conforms with these Regulations must use either—

- (a) the internal design control procedure set out in Part 1 of Schedule 1A to those Regulations; or
- (b) the management system procedure set out in Part 2 of Schedule 1A to those Regulations.

(2) The technical documentation file required for the conformity assessment of a product must contain—

- (a) a copy of the product information provided in accordance with Schedule 9; and
- (b) the details and results of any calculations carried out in accordance with regulation 9 or Schedule 2.

---

(a) See paragraph 1(2) of Schedule 1A to the 2010 Regulations for the meaning of “technical documentation”. Schedule 1A was inserted by S.I. 2019/539.

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

8. The market surveillance authority must use the verification procedure set out in Schedule 4 when verifying the conformity of a product with the requirements of these Regulations.

*[No circumvention/software update provision needed, as Article 7 of EU Regulation 2019/2020 is already fully in force.]*

### **Measurements and calculations**

9. The measurements and calculations required by this Chapter, or necessary for demonstrating or measuring conformity with this Chapter, must be made in accordance with—

- (a) designated standards; or
- (b) other methods which can be demonstrated to be reliable, accurate, and reproducible by the person deploying them, and which take into account the generally recognised state of the art.

## CHAPTER 3

### ENERGY LABELLING OF LIGHT SOURCES

#### **Application**

10.—(1) Subject to paragraph (2), this Chapter applies to light sources, with or without integrated control gears, and includes light sources placed on the market in a containing product.

(2) Schedule 8 specifies exemptions from this Chapter.

#### **Obligations of suppliers**

11.—(1) Suppliers must ensure that—

- (a) each light source which is placed on the market as an independent product and in packaging, is supplied with a label, printed on the packaging, in the format as set out in Schedule 7;
- (b) the parameters of the product information sheet set out in Schedule 9 are entered on a publicly accessible website;
- (c) if specifically requested by the dealer, the product information sheet is made available in printed form;
- (d) the content of the technical documentation<sup>(a)</sup>, set out in Schedule 10, is made available for inspection in accordance with Article 4(2) of the Framework Regulation;
- (e) any visual advertisement for a specific model of light source contains—
  - (i) the energy efficiency class; and
  - (ii) the range of energy efficiency classes available, on the label, in accordance with Schedule 7;
- (f) any technical promotional material concerning a specific model of light source, including material on the internet, includes—
  - (i) the energy efficiency class of that model; and
  - (ii) the range of energy efficiency classes available, on the label, in accordance with Schedules 11 and 12;

---

(a) See Article 4 of the Framework Regulation, as amended by S.I. 2019/539, for the meaning of “technical documentation”.



- (g) an electronic label in the format and containing the information set out in Schedule 7, is made available to dealers for each light source model;
  - (h) an electronic product information sheet, as set out in Schedule 9, is made available to dealers for each light source model;
  - (i) upon request by dealers and in accordance with regulation [xx], printed labels to rescale products are provided as a sticker, of the same size as the existing label.
- (2) Suppliers of containing products must—
- (a) provide information on the contained light source, in accordance with Schedule 9;
  - (b) upon request by the market surveillance authority, provide information on how the light source can be removed for verification without permanent damage to the light source.
- (3) For the purposes of this regulation, a light source is an independent product if it is not in a containing product.
- (4) The energy efficiency class must be calculated in accordance with Schedule 6.

### **Obligations of dealers**

#### **12. Dealers must ensure that—**

- (a) at the point of sale, each light source which is not in a containing product bears the label provided by the supplier in accordance with regulation 11;
- (b) in the case of distance selling, the label and product information sheet are provided, in accordance with Schedules 11 and 12;
- (c) any visual advertisement for a specific model of light source, including any advertisement on the internet, contains—
  - (i) the energy efficiency class; and
  - (ii) the range of energy efficiency classes available on the label, in accordance with Schedules 11 and 12;
- (d) any technical promotional material concerning a specific model of light source which describes its specific technical parameters, including material available on the internet, includes—
  - (i) the energy efficiency class of that model; and
  - (ii) the range of energy efficiency classes available, on the label in accordance with Schedules 11 and 12;
- (e) existing labels on light sources at points of sale are replaced by the rescaled labels in such a way as to cover the existing label, including when the label is printed on or attached to the packaging, within eighteen months after the application of this Regulation.

### **Obligations of internet hosting platforms**

**13.** Where a hosting service provider as referred to in regulation 19 of the Electronic Commerce (EC Directive) Regulations 2002(a) allows the direct selling of light sources through its internet site, the service provider must—

- (a) enable the showing of the electronic label and electronic product fiche sheet provided by the dealer on the display mechanism in accordance with the provisions of Schedule 12; and
- (b) inform the dealer of the obligation to display them.

---

(a) To be completed.

### Measurements and calculations

14. The measurements and calculations required by these Regulations this Chapter, must be made—

- (a) in accordance with Schedule 6, and
- (b) using methods which can be demonstrated to be reliable, accurate, and reproducible by the person deploying them, and which take into account the generally recognised state of the art.

### Verification procedure for market surveillance purposes

15. The market surveillance authority must use the verification procedure set out in Schedule 13 when verifying the conformity of a product with the requirements of these Regulations.

## PART 3 GENERAL

### Review

16.—(1) The Secretary of State must before 1st September 2026—

- (a) evaluate these Regulations, taking into account the speed of technological progress; and
- (b) publish a report stating whether or not, in the opinion of the Secretary of State, these Regulations should be amended.

(2) If the Secretary of State concludes under paragraph (1) that these Regulations should not be amended, the Secretary of State must review this conclusion from time to time and publish a new report under paragraph (1)(b) at intervals not exceeding 5 years.

### Revocations

17. The following Regulations are revoked—

- (a) [from Article 9 of EU reg 2019/2015 and Article 10 of EU reg 2019/2020]

### Amendment of the Ecodesign for Energy-Related Products Regulations 2010

18.—(1) The table at paragraph 4 of Schedule 1 (declaration of conformity) to the 2010 Regulations is amended as follows. **[To be completed]**

(2) For the entry relating to [xx at item xx], substitute—

“xx	xx	The Ecodesign for Energy-Related Products and Energy Information (Lighting Products) Regulations 2021.”
-----	----	---

### Amendment of the Energy Information Regulations 2011

19.—(1) In the Energy Information Regulations 2011(a), at the end of the table in paragraph 1 of Schedule 1 (product-specific measures), add the following entry—

[to be completed]

---

(a) S.I. 2011/1524 [to be completed]

Address  
Date

*Name*  
Parliamentary Under Secretary of State  
Department

## SCHEDULE 1

Regulation 3(12)

### Interpretation of the Schedules

#### Interpretation

1. In this Schedule and Schedules 2 to 13—

“mains light source” (MLS) means a light source that can be operated directly on the mains electricity supply, and includes light sources that operate directly on the mains but can also operate indirectly on the mains using a separate control gear;

“non-mains light source” (NMLS) means a light source that requires a separate control gear to operate on the mains;

“directional light source” (DLS) means a light source which has at least 80% of total luminous flux within a solid angle of  $\pi$  sr (corresponding to a cone with angle of  $120^\circ$ );

“non-directional light source” (NDLS) means a light source that is not a directional light source;

“connected light source” (CLS) means a light source which—

(a) includes data-connection parts that are physically or functionally inseparable from the light emitting parts to maintain the ‘reference control settings’; and

(b) either—

(i) has physically integrated data-connection parts in a single inseparable housing; or

(ii) can be combined with physically separate data-connection parts which are placed on the market together with the light source as a single product;

“connected separate control gear” (CSCG) means a separate control gear which—

(a) includes data-connection parts that are physically or functionally inseparable from the actual control gear parts to maintain the ‘reference control settings; and

(b) either—

(i) has physically integrated data-connection parts in a single inseparable housing; or

(ii) can be combined with physically separate data-connection parts which are placed on the market together with the control gear as a single product;

“data-connection parts” means parts that perform any 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);

“colour-tuneable light source” (CTLS) means a light source that can be set to emit—

(a) light with a large variety of colours outside the range specified in regulation 3(2)(a); and

(b) white light inside that range; and

does not include—

(c) tuneable-white light sources that can only be set to emit light, with different correlated colour temperatures, within the range specified in regulation 3(3)(a); and

(d) 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;

“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(1)), 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)). The excitation purity 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 represents 100% colour purity (point on the locus). The achromatic stimulus point represents 0% colour purity (white light);

“high-luminance light source” (HLLS) means a LED light source with an average luminance greater than  $30 \text{ cd/mm}^2$  in the direction of peak intensity;

“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 ( $\text{cd/m}^2$ );

“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 ( $\text{cd/mm}^2$ );

“lighting control parts”—

(a) means parts that—

- (i) are integrated in a light source or in a separate control gear; or
- (ii) are physically separated but marketed together with a light source or separate control gear as a single product; and
- (iii) enable manual or automatic, direct or remote-control of luminous intensity, chromaticity, correlated colour temperature, light spectrum and/or beam angle; and

(b) [means parts that] are not necessary for—

- (i) the light source to emit light at full-load; or
- (ii) the separate control gear to supply the electric power that enables light source(s) to emit light at full-load; and

(c) includes dimmers and data-connection parts, but does not include products within the scope of Regulation (EC) No 1275/2008;

“non-lighting parts”—

(a) means parts that are—

- (i) integrated in a light source, or in a separate control gear; or
- (ii) physically separated but marketed together with a light source or separate control gear as a single product; and

(b) means parts that are not—

- (i) necessary for the light source to emit light at full-load; or
- (ii) necessary for the separate control gear to supply the electric power that enables light source(s) to emit light at full-load; or
- (iii) lighting control parts; and

(c) includes data-connection parts used for functions other than the control of the light emission function, for example speakers, cameras and repeaters;

“useful luminous flux” ( $\Phi_{\text{use}}$ ), means the part of the luminous flux of a light source that is considered when determining its energy efficiency, and is—

(a) for non-directional light sources, the total flux emitted in a solid angle of  $4\pi \text{ sr}$  (corresponding to a  $360^\circ$  sphere);

- (b) for directional light sources with beam angle  $\geq 90^\circ$ , the flux emitted in a solid angle of  $\pi$  sr (corresponding to a cone with angle of  $120^\circ$ );
- (c) for directional light sources with beam angle  $< 90^\circ$ , the flux emitted in a solid angle of  $0.586 \pi$  sr (corresponding to a cone with angle of  $90^\circ$ );

“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—

- (a) the centre of the front face of the light source; and
- (b) points at which the luminous intensity is 50% of the centre beam intensity;

where—

- (c) the centre beam intensity is the value of luminous intensity measured on the optical beam axis;
- (d) for light sources that have different beam angles in different planes, the largest beam angle must be the one taken into account;
- (e) for light sources with user-controllable beam angle, the beam angle corresponding to the ‘reference control setting’ must be the one taken into account;

“full-load” means—

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

“no-load mode” means the condition of a separate control gear in which—

- (a) its input is connected to the mains power source; and
- (b) its output is—
  - (i) intentionally disconnected from light sources, and, if applicable, from lighting control parts and non-lighting parts; or
  - (ii) if these parts cannot be disconnected, they are switched off and their power consumption is minimised following the manufacturer’s instructions;

“no-load mode” applies only 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;

“standby mode” means the condition of a light source or of a separate control gear where—

- (a) it is connected to the power supply but the light source is intentionally not emitting light; and
- (b) the light source or control gear is awaiting a control signal to return to a state with light emission;
- (c) lighting control parts enabling the standby function must be in their control mode. Non-lighting parts must be disconnected or switched off or their power consumption must be minimised following manufacturer’s instructions;

“networked standby mode” means the condition of a CLS or a CSCG where—

- (a) 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
- (b) it is awaiting a remotely initiated trigger to return to a state with light emission. Lighting control parts must be in their control mode. Non-lighting parts must be disconnected or switched off or their power consumption must be minimised following manufacturer’s instructions;

“control mode” means the condition of lighting control parts where they are—

- (a) connected to the light source or to the separate control gear; and
- (b) performing their functions in such a way that a control signal can—

- (i) be internally generated or a remotely initiated trigger can be received, by wire or wireless; and
- (ii) 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;

“remotely initiated trigger” means a signal that comes from outside the light source or separate control gear via a network;

“control signal” means an analogue or digital signal transmitted—

- (a) to the light source or separate control gear, wired or wirelessly;
- (b) via—
  - (i) voltage modulation in separate control cables; or
  - (ii) a modulated signal in the supply voltage;
- (c) from an internal source or a remote control delivered with the product, and not through a network;

“network” means a communication infrastructure with a topology of links, an architecture, including the physical components, organisational principles, communication procedures and formats (protocols);

“on-mode power” ( $P_{on}$ ), expressed in watt, means the electric power consumption of a light source in full-load with—

- (a) all lighting control parts and non-lighting parts disconnected; or
- (b) if these parts cannot be disconnected, they are switched off or their power consumption is 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;

“no-load power” ( $P_{no}$ ), expressed in watt, is the electric power consumption of a separate control gear in no-load mode;

“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;

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

“reference control settings” (RCS) means—

- (a) a control setting; or
- (b) a combination of control settings;

that is used to check whether a light source conforms to these Regulations, and applies to light sources which allow the end-user to control the luminous intensity, colour, correlated colour temperature, spectrum, or beam angle of the emitted light.

In principle, the reference control settings must 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) must be taken into account.

If the out-of-the-box value is deliberately set differently from the reference control setting (for example, at low power for safety purposes), the manufacturer must 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 different from the reference control setting.

The light source manufacturer must define the reference control settings such that—

- (a) the light source is within the scope of this Regulation according to Article 1 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;
- (d) when the end-user opts to reset factory defaults, the reference control settings are obtained.

For light sources that allow the manufacturer of a containing product to make implementation choices that influence light source characteristics (for example, 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;

“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;

“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, and—

- (a) which has one (“single-ended”) or two (“double-ended”) connectors to its electricity supply;
- (b) in which the material for the arc tube of MH light sources is quartz (QMH) or ceramic (CMH);

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

“T2”, “T5”, “T8”, “T9” and “T12” mean a tubular light source with a diameter of approximately 7, 16, 26, 29 and 38 mm respectively, as defined in standards, and in which the tube shape is straight (linear) or bent (for example U-shaped, circular);

“LFL T5-HE” means a high-efficiency linear fluorescent T5 light source with driving current lower than 0.2 A;

“LFL T5-HO” means a high-output linear fluorescent T5 light source with driving current higher than or equal to 0.2 A;

“LFL T8 2-foot”, “LFL T8 4-foot” or “LFL T8 5-foot” mean 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;

“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;

“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;

HL R7s’ means a mains-voltage, double-capped, linear halogen light source with a cap diameter of 7 mm;

“K39d” means an electrical interface for a light source consisting of 2 wires with eyelets that can be fixed with screws;

“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. ‘G9.5HPL’ includes a heatsink of specific dimensions as used on high-performance halogen lamps, and may include additional pins for grounding purposes;

“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;

“QXL” (Quick eXchange Lamp) means an electrical interface of a light source which—

- (a) consists—
  - (i) on the light source side, of two lateral tabs including the electrical contact surfaces; and
  - (ii) on the opposite (rear) side, of a central protrusion allowing the light source to be grabbed with two fingers; and
- (b) 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;

“battery-operated” means a product which 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;

“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, and for this purpose, the HID arc tubes do not count as an envelope;

“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;

“anti-glare shield”—

- (c) 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;
- (d) does not include surface coating of the light emitter in the directional light source;

“control gear efficiency” means 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. Any lighting control parts and non-lighting parts are disconnected, switched off or set to minimum power consumption according to manufacturer’s instructions and subtracting this power consumption from the overall input power;

“functionality after endurance testing” means the functionality of a LED or OLED light source after endurance testing as set out in Schedule 5;

“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, in which—

- (a) the fluctuations may be periodic and non-periodic and may be induced by the light source itself, the power source or other influencing factors;
- (b) the metric for flicker used in these Regulations is the parameter ‘Pst LM’, where ‘st’ stands for short term and ‘LM’ for light flickermeter method, as defined in standards. A value Pst LM = 1 means that the average observer has a 50% probability of detecting flicker;

“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, in which—

- (a) the fluctuations may be periodic and non-periodic and may be induced by the light source itself, the power source or other influencing factors;
- (b) the metric for the stroboscopic effect used in these Regulations is the ‘SVM’ (stroboscopic visibility measure), as defined in standards. SVM = 1 represents the visibility threshold for an average observer;



“declared value” for a parameter means the values given by a manufacturer, importer or authorised representative in the technical documentation;

“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;

“luminous intensity” (candela or cd) means the quotient of the luminous flux leaving the source and propagated in the element of solid angle containing a given direction, by the element of solid angle;

“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;

“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);

“displacement factor” ( $\cos \phi_1$ )—

- (a) 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;
- (b) is used for mains light sources using LED- or OLED-technology;
- (c) 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;

“lumen maintenance factor” ( $X_{LMF}$ ) means the ratio of the luminous flux emitted by a light source at a given time in its life to the initial luminous flux;

“survival factor” (SF) means the fraction of the total number of light sources that continue to operate at a given time under defined conditions and switching frequency;

“lifetime” or “ $L_{70B50}$  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;

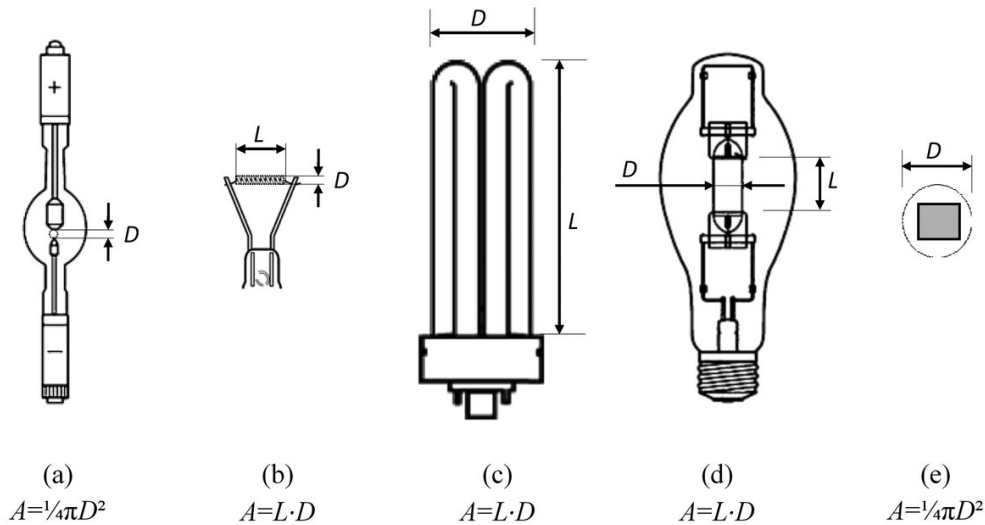
“photosensitive patients” means people with a specific condition causing photosensitive symptoms and who experience adverse reactions to lighting technology;

“projected light-emitting surface area” (A) is the surface area in  $\text{mm}^2$  of the view in an orthographic projection of the light-emitting surface from the direction with the highest light intensity, where the light-emitting surface area is —

- (a) for light sources with a non-clear envelope or with anti-glare shield, the entire area through which light leaves the light source;
- (b) for light sources containing more than one light emitter, the projection of the smallest gross volume enveloping all emitters;
- (c) in all other cases except where paragraph (d) applies, the surface area of the light source that emits light with the declared optical characteristics, including—
  - (i) the approximately spherical surface of an arc (image (a));
  - (ii) the cylindrical surface of a filament coil (image (b));
  - (iii) the cylindrical surface of a gas discharge lamp (image (c) and (d));
  - (iv) the flat or semi-spherical envelope of a light-emitting diode (image (e));as shown in Figure 1;
- (d) for HID light sources the surface area is as set out in paragraph (c)(i), except where the light source has a cylindrical surface (image (d)) whose dimensions are  $L > D$ , where—
  - (i) L is the distance between the electrode tips; and

(ii)  $D$  is the inner diameter of the arc tube;

Figure 1



“R9” means the colour rendering index for a red coloured object as defined in standards;  
“display mechanism” means any screen, including tactile screen, or other visual technology used for displaying internet content to users;

“tactile screen” means a screen responding to touch, such as that of a tablet computer, slate computer or a smartphone.

“nested display” means a visual interface where an image or data set is accessed by a—

- (a) mouse click;
- (b) mouse roll-over; or
- (c) tactile screen expansion, of another image or data set;

“alternative text” means text provided as an alternative to a graphic allowing information to be presented in non-graphical form—

- (a) where display devices cannot render the graphic; or
- (b) as an aid to accessibility such as input to voice synthesis applications;

“quick response” (QR) code means a matrix barcode included on the energy label of a product model that links to that model’s information on a publicly accessible website.

## SCHEDULE 2

Regulation 5

### Ecodesign requirements for light sources and separate control gears

#### Energy efficiency requirements

##### Light sources

1.—(1)The declared power consumption of a light source  $P_{on}$  must 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—

- (a) the values for threshold efficacy ( $\eta$  in  $lm/W$ ) and end loss factor ( $L$  in  $W$ ) are—

- (i) as specified in Table 1, according to the light source type;
  - (ii) constants used for computations and do not reflect true parameters of light sources;
  - (iii) not the minimum required efficacy; the latter can be computed by dividing the useful luminous flux by the computed maximum allowed power.
- (b) 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.
- (c) efficacy factor (F) is—
- (i) 1.00 for non-directional light sources (NDLS, using total flux);
  - (ii) 0.85 for directional light sources (DLS, using flux in a cone);
- (d) CRI factor (R) is—
- (i) 0,65 for CRI  $\leq$  25;
  - (ii) (CRI+80)/160 for CRI  $>$  25;
- rounded to two decimals.

**Table 1**  
**Threshold efficacy ( $\eta$ ) and end loss factor (L)**

<i>Light source description</i>	$\eta$	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 lm 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
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
Connected light sources (CLS) not mentioned above	120.0	2.0
Other light sources not mentioned above	120.0	1.5

**Table 2**  
**Correction factor C depending on light source characteristics**

<i>Light source type</i>	<i>Basic C value</i>
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
<i>Special light source feature</i>	<i>Bonus on C</i>
FL or HID with CCT $>$ 5,000K	+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 · Luminance-HLLS – 0.0167

(2) For the purposes of this paragraph—

- (a) where applicable, bonuses on correction factor C are cumulative.
- (b) the bonus for HLLS must not be combined with the basic C-value for DLS (basic C-value for NDLS must be used for HLLS);
- (c) light sources which 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, must be evaluated using the reference control settings;
- (d) the standby power  $P_{sb}$  of a light source must not exceed 0.5 W;
- (e) the networked standby power  $P_{net}$  of a connected light source must not exceed 0.5 W;
- (f) the allowable values for  $P_{sb}$  and  $P_{net}$  must not be added together.

(3) This paragraph is subject to the exemptions in paragraph 3(3) of Schedule 3.

*Separate control gears*

2.—(1) The minimum energy efficiency requirements of a separate control gear operating at full-load are the values set out in Table 3.

**Table 3**

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

<i>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</i>	<i>Minimum energy efficiency</i>
<u>Control gear for HL light sources</u>	
all wattages $P_{cg}$	0.91
<u>Control gear for FL light sources</u>	
$P_{ls} \leq 5$	0.71
$5 < P_{ls} \leq 100$	$P_{ls}/(2 \times \sqrt{(P_{ls}/36)} + 38/36 \times P_{ls} + 1)$
$100 < P_{ls}$	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 $P_{cg}$	$P_{cg}^{0.81}/(1.09 \times P_{cg}^{0.81} + 2.10)$
-----------------------	--

- (2) For the purposes of this paragraph—
- (a) the requirements of Table 3 apply to multi-wattage separate control gears in respect of the maximum declared power on which they can operate;
  - (b) where a manufacturer or importer has declared in the technical documentation that a separate control gear has been designed for no-load mode, the no-load power  $P_{no}$  of the control gear must not exceed 0.5 W;
  - (c) the standby power  $P_{sb}$  of a separate control gear must not exceed 0.5 W;
  - (d) for a connected separate control gear—
    - (i) the networked standby power  $P_{net}$  of must not exceed 0.5 W; and
    - (ii) the allowable values for  $P_{sb}$  and  $P_{net}$  must not be added together.
- (3) This paragraph is subject to the exemptions in paragraph 3(3) of Schedule 3.

### Functional requirements

3.—(1) The functional requirements specified in Table 4 apply to 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, $\cos \phi_1$ ) at power input $P_{on}$ for LED and OLED MLS	No limit at $P_{on} \leq 5$ W; 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)	The lumen maintenance factor $X_{LMF}\%$ after endurance testing in accordance with Schedule 5 must be at least $X_{LMF,MIN}\%$ calculated as follows— $X_{LMF,MIN}\% = 100 \times e^{-\frac{(3000 \times \ln(0.7))}{L_{70}}}$ where where $L_{70}$ is the declared $L_{70}B_{50}$ lifetime (in hours). If the calculated value for $X_{LMF,MIN}$ exceeds 96.0%, an $X_{LMF,MIN}$ value of 96.0% applies.
Survival factor (for LED and OLED)	Light sources must be operational as specified in row “Survival factor (for LED and OLED)” Schedule 4, Table 5, following the endurance testing given in Schedule 5.
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	$P_{st} \text{ LM} \leq 1,0$ at full-load
Stroboscopic effect for LED and OLED MLS	$SVM \leq 0.4$ at full-load (except for HID with $\Phi_{use} > 4$ klm and for light sources intended for use in outdoor applications, industrial

#### Information requirements

4. The following information requirements apply.

##### *Light sources*

5.—(1) The following information must be displayed on light sources.

(2) For all light sources except CTLS, LFL, CFLni, other FL, and HID—

- (a) the value and physical unit of the useful luminous flux (lm); and
- (b) correlated colour temperature (K);

must be displayed in a legible font on the surface provided that, after the inclusion of safety-related information, there is sufficient space available for it without unduly obstructing the light emission.

(3) For directional light sources, the beam angle (°) must also be indicated.

(4) If there is room for only two values, the useful luminous flux and the correlated colour temperature must be displayed.

(5) If there is room for only one value, the useful luminous flux must be displayed.

##### *Packaging*

##### *Light sources*

6.—(1) Where a light source is placed on the market and is—

- (a) not in a containing product;
- (b) in a packaging containing information to be visibly displayed at a point-of-sale prior to its purchase;

the information listed in sub-paragraph (2) must be clearly and prominently displayed on the packaging.

(2) The information referred to in sub-paragraph (1) is—

- (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°), in a wide cone (120°) or in a narrow cone (90°);
- (b) the—
  - (i) correlated colour temperature, rounded to the nearest 100K, also expressed graphically or in words; or
  - (ii) 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;
- (d) electrical interface details, for example cap- or connector-type, type of power supply (for example 230 V AC 50 Hz, 12 V DC);
- (e) the  $L_{70}B_{50}$  lifetime for LED and OLED light sources, expressed in hours;
- (f) the on-mode power ( $P_{\text{on}}$ ), expressed in W;
- (g) 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;
- (h) the networked standby power ( $P_{\text{net}}$ ) for CLS, expressed in W and rounded to the second decimal, unless the value is zero in which case it may be omitted;
- (i) the colour rendering index, rounded to the nearest integer, or the range of CRI-values that can be set;
- (j) if CRI < 80, and the light source is intended for use in—

- (i) outdoor applications;
- (ii) industrial applications; or
- (iii) other applications where lighting standards allow a CRI < 80,  
a clear indication to this effect, except for HID light sources with useful luminous flux > 4,000 lm, for which this indication is not mandatory;
- (k) if the light source is designed for optimum use in non-standard conditions (such as ambient temperature  $T_a \neq 25^\circ\text{C}$  or where specific thermal management is necessary), information on those conditions;
- (l) a warning if the light source—
  - (i) cannot be dimmed; or
  - (ii) can be dimmed only with specific dimmers or with specific wired or wireless dimming methods;
 and in the latter case a list of compatible dimmers and methods must be provided on the manufacturer’s website;
- (m) if the light source contains mercury, a warning of this, including the mercury content in mg rounded to the first decimal place;
- (n) if the light source is—
  - (i) within the scope of the Waste Electrical and Electronic Equipment Regulations 2013(a), without prejudice to marking obligations pursuant to Article 14(4) of Directive 2012/19/EU; or
  - (ii) contains mercury;
 a warning that it must not be disposed of as unsorted municipal waste.
- (3) Items listed in sub-paragraph (2)(a) to (d) must be displayed on the packaging in the direction intended to face the prospective buyer;
- (4) For light sources that can be set to emit light with different characteristics—
  - (a) the information referred to in sub-paragraph (2) must be provided for the reference control settings; and
  - (b) a range of obtainable values may also be indicated.
- (5) The information referred to in paragraph (2) may be provided—
  - (a) in writing (which does not need to use the exact wording of the requirements in paragraph (2)); or
  - (b) in the form of—
    - (i) graphs;
    - (ii) drawings; or
    - (iii) symbols; or
  - (c) any combination of the above.

*Separate control gears*

- 7.—(1) Where a separate control gear is placed on the market and is—
- (a) not in a containing product;
  - (b) in a packaging containing information to be visibly displayed at a point of sale, prior to their purchase;

the information listed in sub-paragraph (2) must be clearly and prominently displayed on the packaging.

- (2) The information referred to in sub-paragraph (1) is—

---

(a) S.I. 2013/3113 [to be completed]

- (a) for HL, LED and OLED, the maximum output power of the control gear;
- (b) for FL and HID, the power of the light source for which the control gear is intended;
- (c) the type of light source for which the control gear is intended;
- (d) the efficiency in full-load, expressed in percentage;
- (e) the—
  - (i) no-load power ( $P_{no}$ ), expressed in W and rounded to the second decimal; or
  - (ii) indication that the gear is not intended to operate in no-load mode;
 unless the value is zero in which case this may be omitted; but must nonetheless be declared in the technical documentation and on websites;
- (f) the standby power ( $P_{sb}$ ), expressed in W and rounded to the second decimal, unless the value is zero in which case this may be omitted; but must nonetheless be declared in the technical documentation and on websites;
- (g) where applicable, the networked standby power ( $P_{net}$ ), expressed in W and rounded to the second decimal. unless the value is zero in which case this may be omitted; but must nonetheless be declared in the technical documentation and on websites;
- (h) a warning if the control gear—
  - (i) is not suitable for dimming of light sources; or
  - (ii) can be used only with specific types of dimmable light sources or using specific wired or wireless dimming methods;
 and in the latter cases, detailed information on the conditions in which the control gear can be used for dimming must be provided on the manufacturer's or importer's website;
- (i) a QR-code or an internet address for a website—
  - (i) which is accessible to the public without charge; and
  - (ii) where full information on the control gear can be found;
- (3) The information referred to in paragraph (2) may be provided—
  - (a) in writing (which does not need to use the exact wording of the requirements in paragraph (2)); or
  - (b) in the form of—
    - (i) graphs;
    - (ii) drawings; or
    - (iii) symbols; or
  - (c) any combination of the above.

*Websites*

- 8.—**(1) For any separate control gear that is placed on the market, the information listed in sub-paragraph (2) must be available—
- (i) on a website of the manufacturer, authorised representative or importer; and
  - (ii) accessible to the public without charge.
- (2) The information referred to in sub-paragraph (1) is—
- (a) the information specified in paragraph 7(2), except sub-paragraph (2)(i);
  - (b) the outer dimensions in mm;
  - (c) the mass in grams of the control gear—
    - (i) without packaging, and
    - (ii) without lighting control parts and non-lighting parts, if any, where these can be physically separated from the control gear;



- (d) 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;
  - (e) if the control gear can be used with dimmable light sources—
    - (i) a list of minimum characteristics that the light sources should have to be fully compatible with the control gear during dimming;
    - (ii) and a list of compatible dimmable light sources;
  - (f) recommendations on how to dispose of the control gear at the end of its life in accordance with the Waste Electrical and Electronic Equipment Regulations 2013.
- (3) The information referred to in paragraph (2) may be provided—
- (a) in writing (which does not need to use the exact wording of the requirements in paragraph (2)); or
  - (b) in the form of—
    - (i) graphs;
    - (ii) drawings; or
    - (iii) symbols; or
  - (c) any combination of the above.

### **Technical documentation**

**9.**—(1) In addition to the information required by regulation 7(2), the technical documentation file required for the conformity assessment of the product must comply with the following.

(2) The information listed in paragraph 7(2) must also be contained in the technical documentation.

(3) Where the information in the technical documentation for a particular model has been obtained—

- (a) from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer; or
- (b) by calculation on the basis of design or extrapolation from another model of the same or a different manufacturer; or
- (c) both of the above,

the technical documentation must 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.

(4) The technical documentation must include a list of all equivalent models, including the model identifiers.

(5) The technical documentation must include the information in the order and as set out in Schedule 10.

### **Information for products specified in paragraph 3 of Schedule 3**

**10.**—(1) For the light sources and separate control gears specified in sub-paragraph 3(2) of Schedule 3—

- (a) the technical documentation file required for the conformity assessment of the product; and
- (b) all forms of packaging, product information and advertisement;

must contain a statement of the intended use and explicit indication that the light source or separate control gear is not intended to be used for other purposes.

(2) The technical documentation must also—

- (a) list the technical parameters that enable to product to qualify for the exemption; and
- (b) in relation to light sources referred to in paragraph 3(2)(p) of Schedule 3, contain the following statement—
  - “This light source is for use only by photo sensitive patients. Use of this light source will lead to increased energy costs compared to an equivalent more energy efficient product.”.

## SCHEDULE 3

Regulation 4(2)

### Exemptions

#### Specified approvals

1.—(1) Regulations 4 to 9 do not apply to light sources and separate control gears specifically tested and approved to operate—

- (a) in potentially explosive atmospheres, as defined in Directive 2014/34/EU of the European Parliament and of the Council;
- (b) for emergency use, as set out in the Electrical Equipment (Safety) Regulations 2016(a);
- (c) in radiological and nuclear medicine installations, as defined in Article 3 of Council Directive 2009/71/EURATOM;
- (d) in or on military or civil defence establishments, equipment, ground vehicles, marine equipment or aircraft;
- (e) in or on motor vehicles, their trailers and systems, interchangeable towed equipment, components and separate technical units as set out in Regulation (EC) No 661/2009, (EU) No 167/2013 and (EU) No 168/2013 of the European Parliament and of the Council;
- (f) in or on non-road mobile machinery as set out in Regulation (EU) 2016/1628 of the European Parliament and of the Council and in or on trailers for such machinery;
- (g) in or on interchangeable equipment as set out in the Supply of Machinery (Safety) Regulations 2008(b) that—
  - (i) is intended to be—
    - (aa) towed; or
    - (bb) mounted and fully raised from the ground, by vehicles as set out in Regulation (EU) No 167/2013; or
  - (ii) cannot articulate around a vertical axis when the vehicle to which it is attached is in use on a road;
    - in or on civil aviation aircraft, as set out in Commission Regulation (EU) No 748/2012;
- (h) in railway vehicle lighting, as set out in Directive 2008/57/EC of the European Parliament and of the Council;
- (i) in marine equipment, as set out in Directive 2014/90/EU of the European Parliament and of the Council; or
- (j) in medical devices, as set out in the Medical Devices Regulations 2002(c) or Regulation (EU) 2017/745 of the European Parliament and of the Council.

(2) For the purposes of this paragraph “specifically tested and approved” means that the light source or separate control gear—

- (a) has been specifically tested for the stated operating condition or application; and

---

(a) S.I. 2016/1101 [to be completed]  
 (b) S.I. 2008/1597 [to be completed]  
 (c) S.I. 2002/618 [to be completed]

- (b) is accompanied by evidence in the form of a—
    - (i) certificate;
    - (ii) type approval mark; or
    - (iii) test report,
 that the product has been specifically approved for the mentioned operating condition or application; and
  - (c) is placed on the market specifically for the mentioned operating condition or application, as evidenced by—
    - (i) the information in the technical documentation, and;
    - (ii) except for the specified approval referred to in sub-paragraph (1)(d), information on the packaging and any advertising or marketing materials.
- (3) The evidence referred to in sub-paragraph (4)(b) must be included in the technical documentation.

### **Additional exemptions**

2. Regulations xx do not apply to—
- (a) double-capped fluorescent T5 light sources with power  $P \leq 13$  W;
  - (b) electronic displays (such as televisions, computer monitors, notebooks, tablets, mobile phones, e-readers, game consoles), including displays within the scope of Part 1 of these Regulations, and [Commission Regulation (EU) No 617/2013(a)];
  - (c) light sources and separate control gears in battery-operated products, including—
    - (i) torches;
    - (ii) mobile phones with an integrated torch light;
    - (iii) toys with included light sources;
    - (iv) desk lamps operating only on batteries;
    - (v) armband lamps for cyclists;
    - (vi) solar-powered garden lamps;
  - (d) light sources for spectroscopy and photometric applications, including—
    - (i) UV-VIS spectroscopy;
    - (ii) molecular spectroscopy;
    - (iii) atomic absorption spectroscopy;
    - (iv) nondispersive infrared (NDIR), fourier-transform infrared (FTIR), medical analysis, ellipsometry, layer thickness measurement, process monitoring or environmental monitoring;
  - (e) light sources and separate control gears on bicycles and other non-motorised vehicles.

### **Limited exemptions**

3.—(1) Regulations 4 to 9, with the exception of paragraph 10 of Schedule 2, do not apply to light sources and separate control gears which are specifically designed and marketed for intended use in any of the applications listed in sub-paragraph (2).

(2) The applications referred to in sub-paragraph (1) are—

- (a) signalling (including road, railway, marine or air traffic signalling, traffic control or airfield lamps);

---

(a) To be updated (with reference to the new ecodesign SI).

- (b) image capture and image projection (including 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;
- (d) light sources with a peak radiation around 253.7 nm and intended for germicidal use (destruction of DNA);
- (e) light sources intended for disinfection or fly trapping, and emitting—
  - (i) 5% or more of total radiation power of the range 250-800 nm in the range of 250-315 nm; or
  - (ii) 20% or more of total radiation power of the range 250-800 nm in the range of 315-400 nm;
- (f) light sources with the primary purpose of emitting radiation around 185.1 nm and intended to be used for the generation of ozone;
- (g) 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;
- (h) 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;
- (i) 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;
- (j) light sources with a photosynthetic efficacy > 1.2  $\mu\text{mol}/\text{J}$ , 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;
- (k) HID light sources with correlated colour temperature CCT > 7,000K and intended for use in applications requiring such a high CCT;
- (l) light sources with a beam angle of less than 10° and intended for spot-lighting applications requiring a very narrow light beam;
- (m) 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
  - (i) scene-lighting use in film studios, TV studios, and photographic studios; or
  - (ii) stage-lighting use in theatres, discos and during concerts or other entertainment events;
- (n) colour-tuneable light sources that—
  - (i) can be set to at least the colours listed in the table below;
  - (ii) have for each of these colours, measured at the dominant wavelength, a minimum excitation purity of the values in that table; and
  - (iii) are intended for use in applications requiring high-quality coloured light;

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

- (o) light sources accompanied by an individual calibration certificate detailing the exact radiometric flux and/or spectrum under specified conditions, and intended for—
  - (i) use in photometric calibration (for example for wavelength, flux, colour temperature, colour rendering index); or
  - (ii) laboratory use or quality control applications for the evaluation of coloured surfaces and materials under standard viewing conditions (for example standard illuminants);

- (p) light sources provided specifically for use by photosensitive patients, to be sold in pharmacies and other authorised selling points (such as suppliers of disability products), upon presentation of a medical prescription;
- (q) incandescent light sources (not including halogen light sources) which meet all of the following conditions-
  - (i) power  $\leq 40$  W;
  - (ii) length  $\leq 60$  mm;
  - (iii) diameter  $\leq 30$  mm;
  - (iv) declared by the manufacturer to be suitable for operation at ambient temperature  $\geq 300^{\circ}\text{C}$ ;
  - (v) intended for use in high temperature applications such as ovens;
- (r) halogen light sources which meet all of the following conditions—
  - (i) cap-type G4, GY6.35 or G9;
  - (ii) power  $\leq 60$  W;
  - (iii) declared suitable for operation at ambient temperature  $\geq 300^{\circ}\text{C}$ ;
  - (iv) intended for use in high temperature applications such as ovens;
- (s) halogen light sources with blade contact, metal lug, cable, litz wire or non-standard customised electrical interface, specifically designed and marketed for industrial or professional electro-heating equipment (such as stretch blow-moulding process in polyethylene terephthalate (PET) industry, 3D-printing, gluing, inks, paint and coating hardening);
- (t) halogen light sources which meet all of the following conditions—
  - (i) R7s cap;
  - (ii) CCT  $\leq 2,500\text{K}$ ;
  - (iii) length not in the ranges 75-80 mm and 110-120 mm;
  - (iv) specifically designed and marketed for industrial or professional electro-heating equipment (such as stretch blow-moulding process in PET industry, 3D-printing, gluing, inks, paint and coating hardening);
- (u) single capped fluorescent lamps (CFLni) having a diameter of 16 mm (T5), 2G11 4 pin base, with
  - (i) CCT = 3,200K and chromaticity coordinates  $x = 0.415$   $y = 0.377$ ; or
  - (ii) CCT = 5,500K and chromaticity coordinates  $x = 0.330$   $y = 0.335$ ;
 specifically designed and marketed for studio and video applications for traditional filmmaking;
- (v) LED or OLED light sources which comply with the definition of “original works of art” as defined in Directive 2001/84/EC of the European Parliament and of the Council, and are made by the artist in a limited number below 10 pieces;
- (w) white light sources which—
  - (i) are designed and marketed specifically for scene-lighting use in film-studios, TV-studios and locations, and photographic-studios and locations, or for stage-lighting use in theatres, during concerts or other entertainment events; and
  - (ii) provide two or more of the following specifications—
    - (aa) LED with high CRI  $> 90$ ;
    - (bb) GES/E40, K39d socket with changeable Colour Temperature down to 1,800K (undimmed), used with low voltage power supply;
    - (cc) LED rated at 180W and greater and arranged to direct output to an area smaller than the light emitting surface;

- (dd) DWE lamp type which is a tungsten lamp defined by its wattage (650 W) voltage (120 V) and terminal type (pressure screw terminal);
  - (ee) white bi-colour LED sources;
  - (ff) fluorescent tubes: Min BI Pin T5 and Bi Pin T12 with CRI  $\geq$  85 and CCT 2,900, 3,000, 3,200, 5,600 or 6,500K.
- (3) CLS and CSCG designed and marketed specifically—
- (a) for—
    - (i) scene-lighting use in film-studios, TV-studios and locations, and photographic studios and locations; or
    - (ii) stage-lighting use in theatres, discos and during concerts or other entertainment events;
  - (b) where these are also designed for connection to high speed control networks (utilising signalling rates of 250,000 bits per second and higher) in always-listening mode;
- are exempt from the requirements on standby ( $P_{sb}$ ) and on networked standby ( $P_{net}$ ) in paragraphs 1 and 2 of Schedule 2.

## SCHEDULE 4

Regulation 8

### Verification procedure for market surveillance purposes

#### **Interpretation**

1. In this Schedule “determined values” means the values of the relevant parameters as measured in testing and the values calculated from these measurements.

#### **Verification procedure**

2. The market surveillance authority must apply the procedure set out in this Schedule when verifying the conformity of a product with these Regulations.

3. Subject to paragraph 5, the model conforms to these Regulations if all the following conditions are satisfied in respect of the tested unit—

- (a) the declared values and, where applicable, the values used to calculate the declared values, are not more favourable for the manufacturer, importer, or authorised representative than the corresponding determined values;
- (b) the declared values meet the requirements of these Regulations, and any product information published by the manufacturer, importer, or authorised representative does not contain values more favourable for the manufacturer, importer, or authorised representative than the declared values;
- (c) the determined values comply with the respective verification tolerances as given in Table 5, and for this purpose “determined value” means—
  - (i) the arithmetic mean over the tested units of the measured values for a given parameter; or
  - (ii) the arithmetic mean of parameter values calculated from measured values.

4. For paragraph 3(a) and (b), the market surveillance authority must test one single unit of the model of the product to be verified.

5. For paragraph 3(c), the market surveillance authority must test—

- (i) 10 units of the light source model; or
- (ii) 3 units of the separate control gear model.

6. Where a model has been designed to be able to detect it is being tested (for example by recognising test conditions or test cycles), 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 these Regulations or included in the technical documentation or included in any of the documentation provided, the model and all equivalent models do not conform to these Regulations.

### Verification tolerances

7.—(1) The verification tolerances set out in Table 5 must be used only by the market surveillance authority and only for the purposes of this Schedule.

(2) The manufacturer, importer, or authorised representative of a product must not use the verification tolerances—

- (a) as allowed tolerances to establish the declared values;
- (b) in order to interpret the declared values with a view to achieving compliance; or
- (c) to communicate better performance.

**Table 5**

### Verification tolerances

<i>Parameter</i>	<i>Sample size</i>	<i>Verification tolerances</i>
<b>Full-load on-mode power <math>P_{on}</math> [W]:</b>		
$P_{on} \leq 2W$	10	The determined value must not exceed the declared value by more than 0.20 W.
$2W < P_{on} \leq 5W$	10	The determined value must not exceed the declared value by more than 10%.
$5W < P_{on} \leq 25W$	10	The determined value must not exceed the declared value by more than 5%.
$25W < P_{on} \leq 100W$	10	The determined value must not exceed the declared value by more than 5%.
$100W < P_{on}$	10	The determined value must not exceed the declared value by more than 2.5%.
Displacement factor [0-1]	10	The determined value must not be less than the declared value minus 0.1 units.
Useful luminous flux $\Phi_{use}$ [lm]	10	The determined value must not be less than the declared value minus 10%.
No-load power $P_{no}$ , Standby power $P_{sb}$ and Networked standby power $P_{net}$ [W]	10	The determined value must not exceed the declared value by more than 0.10 W.
CRI [0-100]	10	The determined value must not be less than the declared value by more than 2.0 units.
Flicker [ $P_{st}$ LM] and stroboscopic effect [SVM]	10	The determined value must not exceed the declared value by more than 10%.
Colour consistency [MacAdam ellips steps]	10	The determined number of steps must not exceed the declared number of steps. The centre of the MacAdam ellipse must be the centre declared by the supplier with a tolerance of 0.005 units.
Beam angle (degrees)	10	The determined value must not deviate from the declared value by more than 25%.
Control gear efficiency [0-1]	3	The determined value must not be less than the declared value minus 0.05 units.

Lumen maintenance factor (for LED and OLED)	10	The determined $X_{LMF}\%$ of the sample following the test in Schedule 5 of these Regulations must not be less than $X_{LMF, MIN}\%$ (1).
Survival factor (for LED and OLED)	10	At least 9 light sources of the test sample must be operational after completing the test in Schedule 5.
Excitation purity [%]	10	The determined value must not be less than the declared value minus 5%.
Correlated colour temperature [K]	10	The determined value must not deviate from the declared value by more than 10%.

(3) For light sources with linear geometry which are scalable but of very long length, such as LED strips or strings, verification testing must 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 must indicate which separate control gear is suitable for this length.

(4) When verifying if a product is a light source, the market surveillance authority must compare the measured values for—

- (a) chromaticity coordinates (x and y);
- (b) luminous flux;
- (c) luminous flux density; and
- (d) colour rendering index;

directly with the limit values set out in the definition for light source in regulation 3(1), without applying any tolerances.

(5) If any of the 10 units in the sample satisfies the conditions for being a light source, the product model must be considered to be a light source.

(6) Light sources that allow the end-user to control, manually or automatically, directly or remotely—

- (a) the luminous intensity;
- (b) colour;
- (c) correlated colour temperature;
- (d) spectrum; or
- (e) beam angle;

of the emitted light, must be tested using the reference control settings.

## SCHEDULE 5

Regulation xx

### Functionality after endurance testing

**1.**—(1) Models of LED and OLED light sources must undergo endurance testing to check their lumen maintenance and survival factor.

(2) The market surveillance authority must—

- (a) carry out endurance testing in accordance with the method set out in this Schedule; and
- (b) test 10 units of the model for this test.

**2.**—(1) The endurance test for LED and OLED light sources must be conducted as follows.

*Ambient conditions and test set-up*

(2) The switching cycles must be conducted in a room with—

- (a) an ambient temperature of  $25 \pm 10^\circ\text{C}$ ; and



(b) an average air velocity of less than 0.2 m/s.

(3) The switching cycles on the sample must be conducted in free air in a vertical base-up position, unless a manufacturer or importer has declared the light source suitable for use in a specific orientation only, in which case the sample must be mounted in that orientation.

(4) The applied voltage during the switching cycles must have a tolerance within 2%, and the total harmonic content of the supply voltage must not exceed 3%. Standards provide guidance on the supply voltage source.

(5) Light sources designed to be operated on mains voltage must be tested at 230 V, 50 Hz supply, even if the products are able to be operated on variable supply conditions.

*Endurance test method*

(6) The luminous flux of the light source must be measured prior to starting the endurance test switching cycle.

(7) The light source must be operated for 1,200 cycles of repeated, continuous switching cycles without interruption, and for this purpose—

(a) 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; and

(b) the hours of operation recorded (3,000 hours) include only the periods of the switching cycle when the light source was switched ON, so that the total test time is 3,600 hours.

(8) Subject to sub-paragraph (9), at the end of the 1,200 switching cycles the luminous flux of the light sources must be measured.

(9) Any light sources that have failed the test in accordance with the “Survival factor” in Table 5 in Schedule 4 must not be measured.

(10) For each of the units in the sample that did not fail, the measured final flux must be divided by the measured initial flux.

(11) The resulting values must be averaged over all the units that did not fail to compute the determined value for the lumen maintenance factor  $X_{LMF}^{\circ}$ .

## SCHEDULE 6

Regulation 11(4)

### Energy labelling of light sources – energy efficiency classes and calculation method

1. The energy efficiency class of light sources must be determined as set out in Table 6, on the basis of the total mains efficacy  $\eta_{TM}$ , which is calculated by—

(a) dividing the declared useful luminous flux  $\Phi_{use}$  (expressed in *lm*) by the declared on-mode power consumption  $P_{on}$  (expressed in *W*); and

(b) multiplying by the applicable factor  $F_{TM}$  of Table 7;

as follows—

$$\eta_{TM} = (\Phi_{use}/P_{on}) \times F_{TM} \text{ (lm/W)}.$$

**Table 6**

#### Energy efficiency classes of light sources

Energy efficiency class	Total mains efficacy $\eta_{TM}$ (lm/W)
A	$210 \leq \eta_{TM}$
B	$185 \leq \eta_{TM} < 210$
C	$160 \leq \eta_{TM} < 185$
D	$135 \leq \eta_{TM} < 160$
E	$110 \leq \eta_{TM} < 135$

F	$85 \leq \eta_{TM} < 110$
G	$\eta_{TM} < 85$

**Table 7**

**Factors  $F_{TM}$  by light source type**

<i>Light source type</i>	<i>Factor <math>F_{TM}</math></i>
Non-directional (NDLS) operating on mains (MLS)	1.000
Non-directional (NDLS) not operating on mains (NMLS)	0.926
Directional (DLS) operating on mains (MLS)	1.176
Directional (DLS) not operating on mains (NMLS)	1.089

## SCHEDULE 7

Regulation 11(1)(a)

### Labels for light sources

**Format and placing of labels**

1.—(1) If a light source is intended to be marketed through a point of sale, a label produced in the format and containing information set out in this Schedule must be printed on the individual packaging.

(2) Subject to sub-paragraph (6), suppliers may choose the standard or small sized label format shown in paragraph 2.

(3) The label must be—

- (a) for the standard sized label, at least 36 mm wide and 75 mm high;
- (b) for the small label, at least 20 mm wide and 54 mm high.

(4) The packaging must not be smaller than 20 mm wide and 54 mm high.

(5) Where the label is printed in a larger format, its content must remain proportionate to the specifications above.

(6) The small label must not be used on packaging with a width of 36 mm or more.

(7) The label and the arrow indicating the energy efficiency class may be printed in monochrome only if all other information on the packaging, including graphics, is printed in monochrome.

(8) If the label is not printed on the part of the packaging intended to face the prospective customer, an arrow containing the letter of the energy efficiency class as shown in Figure 2 must be displayed on that part as follows—

- (a) the colour of the arrow must match the colour of the energy efficiency class as specified in paragraph 3;
- (b) the label must be clearly visible and legible;
- (c) the letter in the energy efficiency class arrow must be positioned in the centre of the rectangular part of the arrow, with a border of 0.5 pt in black around the arrow and the letter of the energy efficiency class.

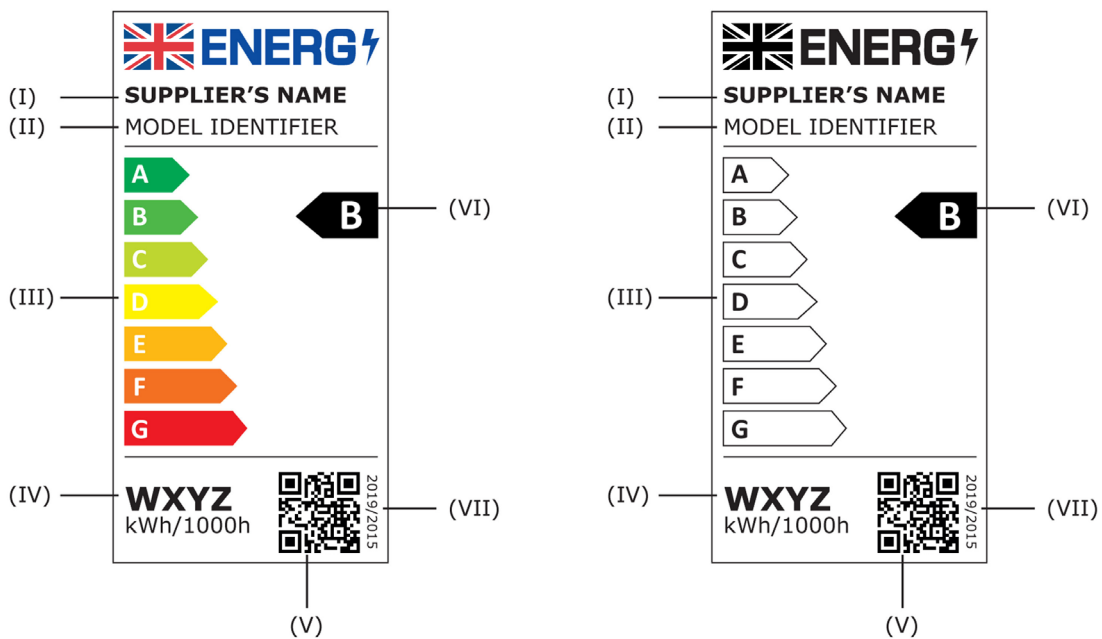
Figure 2

Coloured/monochrome left/right arrow for the part of the packaging facing the prospective customer

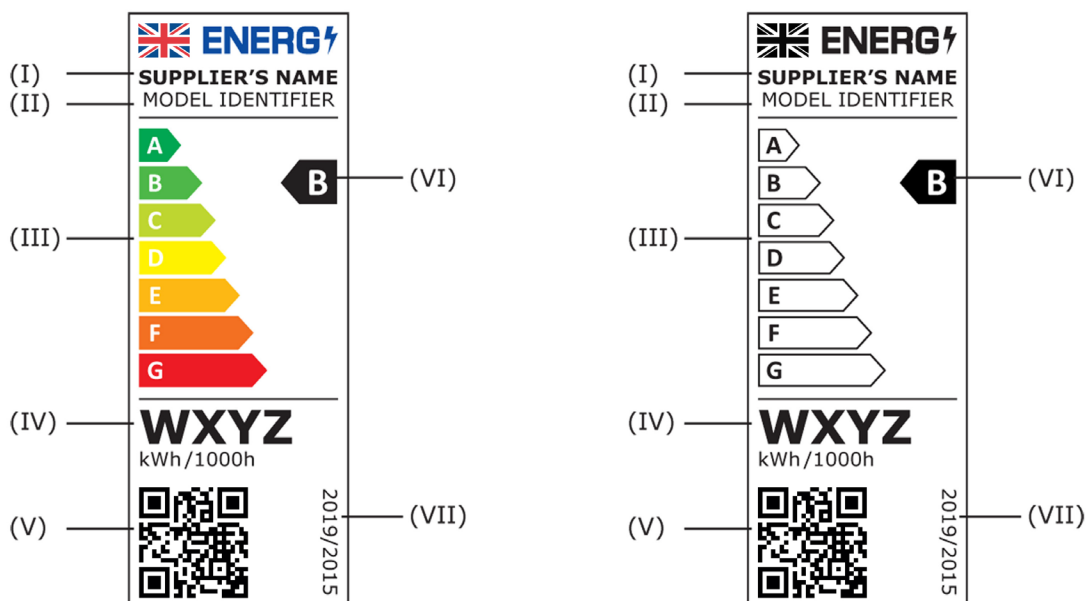


(9) Where a label is intended to replace an existing label in accordance with regulation 12(e), the rescaled label must be in a format and size that permits it to adhere to and cover the old label.

2.—(1) The format of the standard sized label is as follows—



(2) The format of the small label is as follows—

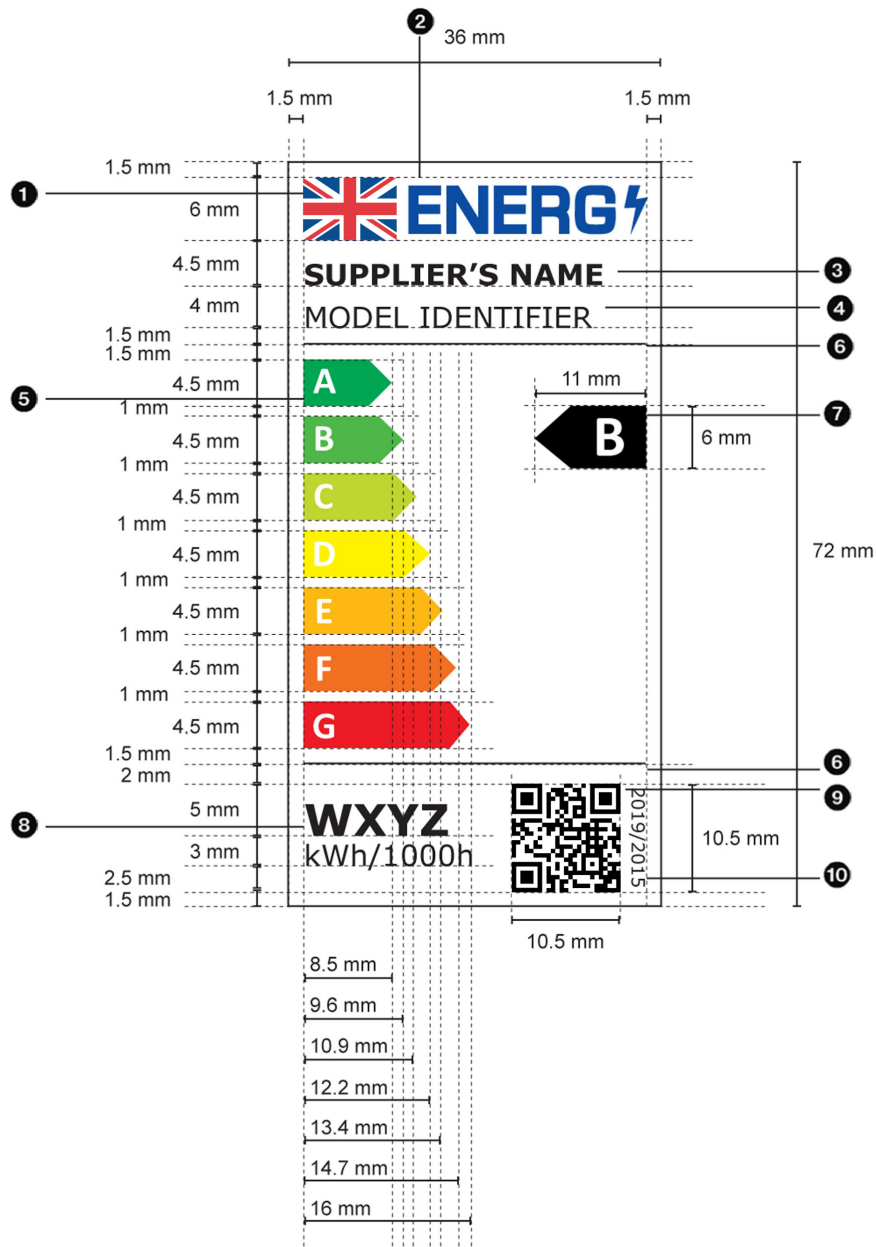


- (3) The following information must be included in the label—
- (a) the supplier’s name or trade mark;
  - (b) the supplier’s model identifier;
  - (c) the scale of energy efficiency classes from A to G;
  - (d) the energy consumption, expressed in kWh of electricity consumption per 1,000 hours, of the light source in on-mode;
  - (e) the QR-code;
  - (f) the energy efficiency class in accordance with Schedule 6;
  - (g) the number of these Regulations, that is [SI number].

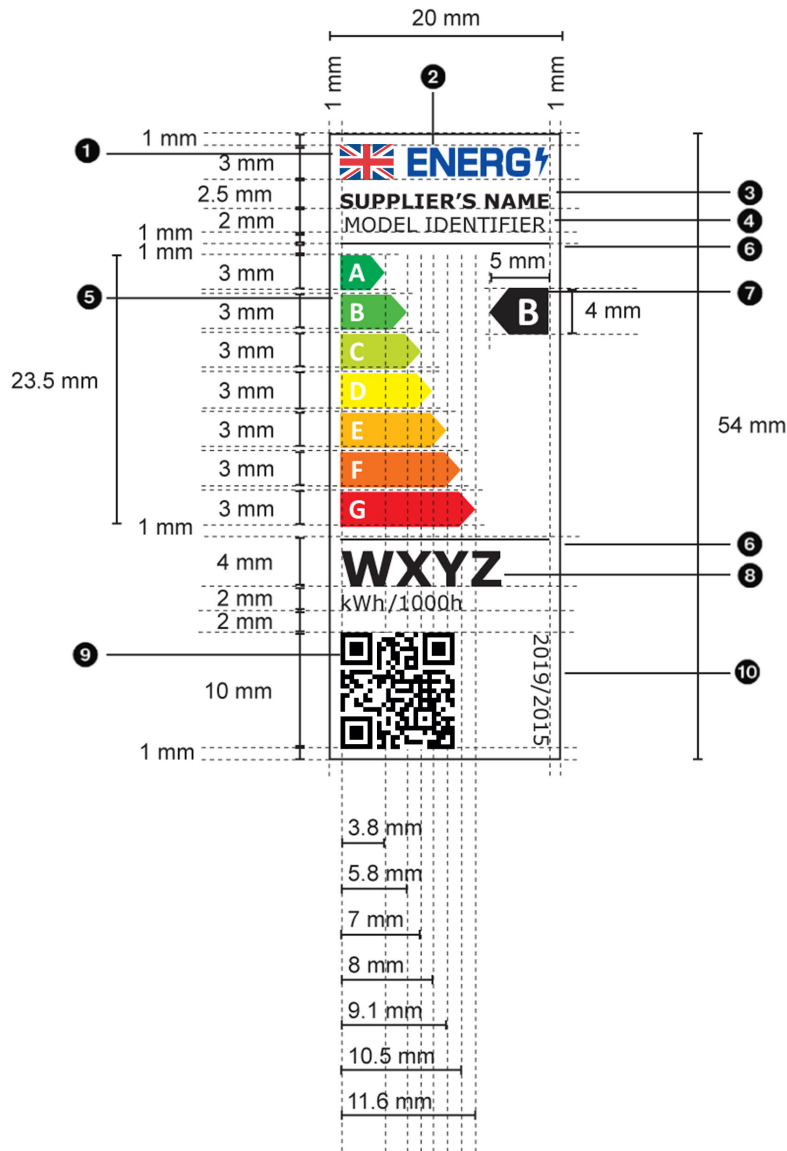
**Label designs**

3.—(1) The label designs for light sources are as follows-

- (a) standard sized label—



(b) small label—



(2) The labels must meet the following requirements.

(3) The background of the label must be 100% white.

(4) The typefaces must be Verdana and Calibri.

(5) The dimensions and specifications of the elements constituting the label must be as indicated in the label designs in sub-paragraph (1).

(6) The colours used must be cyan, magenta, yellow and black (CMYB) in the proportions specified below.

(7) For the purposes of this paragraph, colour proportions are expressed in CMYB percentages, for example—

0,70,100,0 = 0% cyan, 70% magenta, 100% yellow, 0% black.

(8) The labels must fulfil all the following requirements in relation to the areas marked by numbers in the diagrams above—

(a) area 1: the colours of the UK flag must be as follows—

—the blue background: 100,72,00,18.5;

—the red crosses: 00,100,81,4

- the remaining part: 100% white;
- (b) area 2: the colour of the energy logo must be 100,80,0,0;
  - (c) area 3: the supplier’s name must be 100% black and in Verdana Bold, 8 pt for the standard sized label and 5 pt for the small label;
  - (d) area 4: the model identifier must be 100% black and in Verdana Regular 8 pt for the standard sized label and 5 pt for the small label;
  - (e) area 5: the A to G scale must be as follows—
    - (i) the letters of the energy efficiency scale must be—
      - (aa) 100% white and in Calibri Bold Regular 10.5 pt for the standard sized label and 7 pt for the small label; and
      - (bb) centred on an axis at 4.5 mm from the left side of the arrows;
    - (ii) the colours of the A to G scale arrows must be as follows—
      - A-class: 100,0,100,0;
      - B-class: 70,0,100,0;
      - C-class: 30,0,100,0;
      - D-class: 0,0,100,0;
      - E-class: 0,30,100,0;
      - F-class: 0,70,100,0;
      - G-class: 0,100,100,0;
  - (f) area 6: the internal dividers must have a weight of 0.5 pt and the colour must be 100% black;
  - (g) area 7—
    - (i) the letter of the energy efficiency class must be 100% white and in Calibri Bold 16 pt for the standard sized label and 10 pt for the small label;
    - (ii) the energy efficiency class arrow and the corresponding arrow in the A to G scale must be positioned in such a way that their tips are aligned;
    - (iii) the letter in the energy efficiency class arrow must be positioned in the centre of the rectangular part of the arrow, which must be 100% black;
  - (h) area 8: the energy consumption value must be in Verdana Bold 12 pt, ‘kWh/annum’ must be in Verdana Regular 8 pt for the standard sized label and 5 pt for the small label, and both must be centred and 100% black;
  - (i) area 9: the QR code must be 100% black;
  - (j) area 10: the number of the Regulations must be 100% black and in Verdana Regular 5 pt.

## SCHEDULE 8

Regulation 10(2)

### Exemptions

1. Regulations 10 to 15 do not apply to a light source which meets any of the conditions in paragraph 1(1) of Schedule 3, with the exception of sub-paragraph (1)(a).
2. Regulations 10 to 15 do not apply to—
  - (a) electronic displays (such as televisions, computer monitors, notebooks, tablets, mobile phones, e-readers, game consoles), including displays within the scope of Part 1 of these Regulations, and of [Commission Regulation (EU) No 617/2013(a)];

---

(a) To be updated

- (b) light sources in range hoods within the scope of Commission Delegated Regulation (EU) No 65/2014;
- (c) light sources in battery-operated products, including—
  - (i) torches;
  - (ii) mobile phones with an integrated torch light;
  - (iii) toys with included light sources;
  - (iv) desk lamps operating only on batteries;
  - (v) armband lamps for cyclists;
  - (vi) solar-powered garden lamps;
- (d) light sources on bicycles and other non-motorised vehicles.
- (e) light sources for spectroscopy and photometric applications, including—
  - (i) UV-VIS spectroscopy;
  - (ii) molecular spectroscopy;
  - (iii) atomic absorption spectroscopy;
  - (iv) nondispersive infrared (NDIR), fourier-transform infrared (FTIR), medical analysis, ellipsometry, layer thickness measurement, process monitoring or environmental monitoring.

3.—(1) Except as provided in sub-paragraph (2), regulations 10 to 15 do not apply to a light source which meets any of the conditions in paragraph 3(2)(a) to (j) or (v) of Schedule 3.

(2) For the light sources to which this paragraph applies—

- (a) the technical documentation file; and
- (b) all forms of packaging, product information and advertisement;

must contain a statement of the intended use and explicit indication that the light source is not intended to be used for other purposes.

(3) The technical documentation must also list the technical parameters that enable the product to qualify for the exemption.

## SCHEDULE 9

Regulation 11(1)(b)

### Product information

#### Product information sheet

1. In accordance with regulation 11(1)(b), the supplier must enter the information set out in Table 8 on a publicly accessible website. The information must be available free of charge and on a page of the website that does not contain any other information.

**Table 8**

#### Product information sheet

Supplier's name or trade mark:			
Supplier's address:			
Model identifier:			
Type of light source:			
Where the light source is no longer placed on the market, the date that placement on the market ceased:			
Lighting technology used:	[HL/LFL T5 HE/LFL T5 HO/CFLni/other	Non-directional or directional:	[NDLS/DLS]

	FL/HPS/MH/other HID/LED/OLED/mixed/ other]		
Mains or non-mains:	[MLS/NMLS]	Connected light source (CLS):	[yes/no]
Colour-tuneable light source:	[yes/no]	Envelope:	[no/second/non-clear]
High luminance light source:	[yes/no]		
Anti-glare shield:	[yes/no]	Dimmable:	[yes/only with specific dimmers/no]
Product parameters			
Parameter	Value	Parameter	Value
General product parameters			
Energy consumption in on-mode (kWh/1,000 h)	x	Energy efficiency class	[A/B/C/D/E/F/G]
Useful luminous flux ( $\Phi_{use}$ ), indicating if it refers to the flux in a sphere (360°), in a wide cone (120°) or in a narrow cone (90°)	x in [sphere/wide cone/narrow cone]	Correlated colour temperature, rounded to the nearest 100K, or the range of correlated colour temperatures, rounded to the nearest 100K, that can be set	[x/x...x]
On-mode power ( $P_{on}$ ), expressed in W	x.x	Standby power ( $P_{sb}$ ), expressed in W and rounded to the second decimal point	x.xx
Networked standby power ( $P_{net}$ ) for CLS, expressed in W and rounded to the second decimal point	x.xx	Colour rendering index, rounded to the nearest integer, or the range of CRI-values that can be set	[x/x...x]
Outer dimensions without separate control gear, lighting control parts and non-lighting control parts, if any (millimetre)	Height	x	Spectral power distribution in the range 250 nm to 800 nm, at full-load
	Width	x	
	Depth	x	
Claim of equivalent power (see paragraph [2(1)])	[yes/-]	If yes, equivalent power (W)	x
		Chromaticity coordinates (x and y)	0.xxx 0.xxx
Parameters for directional light sources:			
Peak luminous intensity (cd)	x	Beam angle in degrees, or the range of beam angles that can be set	[x/x...x]



Parameters for LED and OLED light sources:			
R9 colour rendering index value	x	Survival factor	x.xx
The lumen maintenance factor	x.xx		
Parameters for LED and OLED mains light sources:			
Displacement factor (cos $\phi$ 1)	x.xx	Colour consistency in McAdam ellipses	x
Claims that an LED light source replaces a fluorescent light source without integrated ballast of a particular wattage (see paragraph [2(3)]).	[yes/-]	If yes then replacement claim (W)	x
Flicker metric (Pst LM)	x.x	Stroboscopic effect metric (SVM)	x.x

2.—(1) An equivalence claim involving the power of a replaced light source type may be given only—

(a) for directional light sources, if the light source type is listed in Table 9 and if the luminous flux of the light source in a 90° cone ( $\Phi_{90^\circ}$ ) is not lower than the corresponding reference luminous flux in Table 9. The reference luminous flux must be multiplied by the correction factor in Table 10. For LED light sources, it must be in addition multiplied by the correction factor in Table 11;

(b) for non-directional light sources, the claimed equivalent incandescent light source power (rounded to 1W) must be that corresponding in Table 12 to the luminous flux of the light source.

(2) The intermediate values of both the luminous flux and the claimed equivalent light source power (rounded to the nearest 1W) must be calculated by linear interpolation between the two adjacent values.

(3) A claim that a LED light source replaces a fluorescent light source 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 light source is not lower than the luminous flux of the fluorescent light source of the claimed wattage. The luminous flux of the fluorescent light source must be obtained by multiplying the claimed wattage with the minimum luminous efficacy value corresponding to the fluorescent light source in Table 13; and

(c) the wattage of the LED light source is not higher than the wattage of the fluorescent light source it is claimed to replace.

(4) The technical documentation file must provide the data to support such claims.

(5) For light sources that can be tuned to emit light at full-load with different characteristics, the values of parameters that vary with these characteristics must be reported at the reference control settings.

**Table 9**

**Reference luminous flux for equivalence claims**

Type	Power	Reference $\Phi_{90^\circ}$ (lm)
Extra-low voltage reflector type		
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
Mains-voltage blown glass reflector type		
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	1,000
Mains-voltage pressed glass reflector type		
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 10**  
**Multiplication factors for lumen maintenance**

<i>Light source type</i>	<i>Luminous flux multiplication factor</i>
Halogen light sources	1
Fluorescent light sources	1.08
LED light sources	$1 + 0.5 \times (1 - \text{LLMF})$ where LLMF is the lumen maintenance factor at the end of the declared lifetime

**Table 11**

### Multiplication factors for LED light sources

<i>LED light source beam angle</i>	<i>Luminous flux multiplication factor</i>
20° ≤ beam angle	1
15° ≤ beam angle < 20°	0.9
10° ≤ beam angle < 15°	0.85
beam angle < 10°	0.8

**Table 12**

### Equivalence claims for non-directional light sources

<i>Rated light source luminous flux <math>\Phi</math> (lm)</i>	<i>Claimed equivalent incandescent light source power (W)</i>
136	15
249	25
470	40
806	60
1,055	75
1,521	100
2,452	150
3,452	200

**Table 13**

### Minimum efficacy values for T8 and T5 light sources

<i>T8 (26 mm Ø)</i>		<i>T5 (16 mm Ø) High Efficiency</i>		<i>T5 (16 mm Ø) High output</i>	
<i>Claimed equivalent power (W)</i>	<i>Minimum luminous efficacy (lm/W)</i>	<i>Claimed equivalent power (W)</i>	<i>Minimum luminous efficacy (lm/W)</i>	<i>Claimed equivalent power (W)</i>	<i>Minimum luminous efficacy (lm/W)</i>
15	63	14	86	24	73
18	75	21	90	39	79
25	76	28	93	49	88
30	80	35	94	54	82
36	93			80	77
38	87				
58	90				
70	89				

### Information to be displayed in the documentation for a containing product

3.—(1) If a light source is placed on the market as a part in a containing product, the technical documentation for the containing product must clearly identify the contained light source, including the energy efficiency class.

(2) If a light source is placed on the market as a part in a containing product, the following text must be displayed, clearly legible, in the user manual or booklet of instructions:

“This product contains a light source of energy efficiency class <X>”,

where <X> is to be replaced by the energy efficiency class of the contained light source.

(3) If the product contains more than one light source, the sentence referred to in subparagraph (2) may be in the plural, or repeated per light source, as appropriate.

### Information to be displayed on the supplier's website

4. The following information must be shown on the supplier's website—
- (a) the reference control settings, and instructions on how they can be implemented, where applicable;
  - (b) instructions on how to remove lighting control parts or non-lighting parts, if any, or how to switch them off or minimise their power consumption;
  - (c) If the light source is dimmable—
    - (i) a list of dimmers with which it is compatible; and
    - (ii) the light source-dimmer compatibility standard with which it is compliant, if any;
  - (d) if the light source contains mercury, instructions on how to clean up the debris in case of accidental breakage;
  - (e) recommendations on how to dispose of the light source at the end of its life in line with the Waste Electrical and Electronic Equipment Regulations 2013;
- and for this purpose the website must be accessible to the public without charge.

## SCHEDULE 10

Regulation 11(1)(d)

### Technical documentation

1. The technical documentation referred to in regulation 11(1)(d) must include the following—
- (a) the name and address of the supplier;
  - (b) the supplier's model identifier;
  - (c) the model identifier of all equivalent models already placed on the market;
  - (d) identification and signature of the person empowered to bind the supplier;
  - (e) the declared and measured values for the following technical parameters:
    - (i) useful luminous flux ( $\Phi_{use}$ ) in lm;
    - (ii) colour rendering index (CRI);
    - (iii) on-mode power ( $P_{on}$ ) in W;
    - (iv) beam angle in degrees for directional light sources (DLS);
    - (v) correlated colour temperature (CCT) in K for FL and HID light sources;
    - (vi) standby power ( $P_{sb}$ ) in W, including when it is zero;
    - (vii) networked standby power ( $P_{net}$ ) in W for connected light sources (CLS);
    - (viii) displacement factor ( $\cos \phi$ ) for LED and OLED mains light sources;
    - (ix) colour consistency in MacAdam ellipse steps for LED and OLED light sources;
    - (x) luminance-HLLS in  $cd/mm^2$  (only for HLLS)
    - (xi) flicker metric ( $P_{stLM}$ ) for LED and OLED light sources;
    - (xii) stroboscopic effect metric (SVM) for LED and OLED light sources;
    - (xiii) excitation purity, only for CTLS, for the colours and dominant wavelength within the given range in the following table—

<i>Colour</i>	<i>Dominant wavelength range</i>
Blue	440 nm - 490 nm
Green	520 nm - 570 nm
Red	610 nm - 670 nm

- (f) the calculations performed with the parameters, including the determination of the energy efficiency class;

- (g) references to the designated standards applied or other standards used;
- (h) testing conditions if not described fully in sub-paragraph (g);
- (i) the reference control settings, and instructions on how they can be implemented, where applicable;
- (j) instructions on how to remove lighting control parts and/or non-lighting parts, if any, or how to switch them off or minimise their power consumption during light source testing;
- (k) specific precautions that must be taken when the model is assembled, installed, maintained or tested.

## SCHEDULE 11

Regulation 12

### Information to be provided in visual advertisements, technical promotional material, and in distance selling except distance selling on the internet

**1.—(1) In—**

- (a) visual advertisements for light sources, for the purposes of the requirements of regulation 11(1)(e) and 12(c); and
- (b) in technical promotional material for light sources, for the purposes of the requirements of regulation 11(1)(f) and 12(d);

the energy efficiency class and the range of energy efficiency classes available on the label must be shown as set out in paragraph 2.

(2) Any paper-based distance selling of light sources must show the energy efficiency class and the range of energy efficiency classes available on the label as set out paragraph 2.

**2.—(1) The energy efficiency class and the range of energy efficiency classes must be shown, as indicated in Figure 3, with—**

- (a) an arrow containing the letter of the energy efficiency class, in white, Calibri Bold and in—
  - (i) if the price is shown, a font size at least equivalent to that of the price; and
  - (ii) in all other cases, a font size that is clearly visible and legible;
- (b) subject to sub-paragraph (2), the colour of the arrow matching the colour of the energy efficiency class as specified in Schedule 7;
- (c) the range of available energy efficiency classes shown in 100% black; and
- (d) the size such that the arrow is clearly visible and legible;
- (e) the letter in the energy efficiency class arrow positioned in the centre of the rectangular part of the arrow, with a border of 0.5 pt in black around the arrow and the letter of the energy efficiency class.

(2) If the visual advertisement, technical promotional material or paper-based distance selling is printed in monochrome, the arrow may be in monochrome.

*Figure 3*

*Coloured/monochrome left/right arrow, with range of energy efficiency classes indicated*



**3. Telemarketing based distance selling must specifically inform the customer of the energy efficiency class of the product and of the range of energy efficiency classes available on the label,**

and that the customer can access the full label and the product information sheet by requesting a printed copy or accessing a website that is publicly available free of charge.

4. For all the situations referred to in paragraphs 1 and 5, it must be possible for the customer to obtain a printed copy of the label and the product information sheet on request.

## SCHEDULE 12

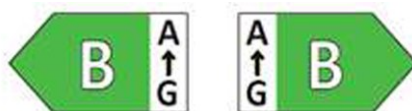
Regulation 12

### Information to be provided in the case of distance selling through the internet

1. The following requirements apply to distance selling through the internet.
- 2.—(1) The appropriate label made available by suppliers in accordance with regulation 11(1)(g) must be shown on the display mechanism in proximity to the price of the product.
  - (2) The size of the label must be such that the label is clearly visible and legible, and must be proportionate to the size specified for the standard label in paragraph 3(1) of Schedule 7.
  - (3) If the label is displayed using a nested display, the image used for accessing the label must comply with the specifications set out in paragraph 3.
  - (4) If nested display is used, the label must appear on the first mouse click, mouse roll-over or tactile screen expansion on the image.
3. The image used for accessing the label in the case of a nested display, as indicated in Figure 4, must—
  - (a) be an arrow in the colour corresponding to the energy efficiency class of the product on the label;
  - (b) indicate the energy efficiency class of the product on the arrow in white, Calibri Bold and in a font size equivalent to that of the price;
  - (c) have the range of available energy efficiency classes in 100% black; and,
  - (d) be of such a size that the arrow is clearly visible and legible, and in one of the following two formats shown in Figure 4;
  - (e) position the letter in the energy efficiency class arrow in the centre of the rectangular part of the arrow, with a visible border in 100% black placed around the arrow and the letter of the energy efficiency class.

Figure 4

*Coloured left/right arrow, with range of energy efficiency classes indicated*



4. In the case of a nested display, the sequence of display of the label must be as follows—
  - (a) the image referred to paragraph 3 must be shown on the display mechanism in proximity to the price of the product;
  - (b) the image must link to the label set out in Schedule 7;
  - (c) the label must be displayed after a mouse click, mouse roll-over or tactile screen expansion on the image;
  - (d) the label must be displayed by pop-up, new tab, new page or inset screen display;
  - (e) for magnification of the label on tactile screens, the device conventions for tactile magnification must apply;
  - (f) the label must cease to be displayed only by means of a close option or other standard closing mechanism;

- (g) the alternative text for the graphic, to be displayed on failure to display the label, must be the energy efficiency class of the product in a font size equivalent to that of the price.

5.—(1) The electronic product information sheet made available by suppliers in accordance with regulation 11(1)(h) must be shown on the display mechanism in proximity to the price of the product.

(2) The size of the information sheet must be such that the sheet is clearly visible and legible.

(3) If the product information sheet is displayed using a nested display or by referring to a publicly available website, in which case the link used for accessing the product information sheet must clearly and legibly indicate “Product information sheet”.

(4) If a nested display is used, the product information sheet must appear on the first mouse click, mouse roll-over or tactile screen expansion on the link.

## SCHEDULE 13

Regulation 15

### Verification procedure for market surveillance purposes

#### Interpretation

1. In this Schedule “determined values” means the values of the relevant parameters as measured in testing and the values calculated from these measurements.

#### Verification procedure

2. The market surveillance authority must apply the procedure set out in this Schedule when verifying the conformity of a product with these Regulations.

3.—(1) Subject to paragraph 4, the model conforms to these Regulations if all the following conditions are satisfied in respect of the tested unit—

- (a) the declared values and, where applicable, the values used to calculate the declared values, are not more favourable for the supplier than the corresponding determined values;
- (b) the values published on the label and in the product information sheet are not more favourable for the supplier than the declared values, and the indicated energy efficiency class is not more favourable for the supplier than the class determined by the declared values; and
- (c) the determined values comply with the respective verification tolerances as given in Table 14, and for this purpose “determined value” means—
  - (i) the arithmetic mean over the tested units of the measured values for a given parameter; or
  - (ii) the arithmetic mean of parameter values calculated from measured values.

4.—(1) For paragraph 3(a) and (b), the market surveillance authority must test one single unit of the model of the product to be verified.

(2) For paragraph 3(c), the market surveillance authority must test 10 units of the model.

#### Verification tolerances

5.—(1) The verification tolerances set out in Table 14 must be used only by the market surveillance authority and only for the purposes of this Schedule.

(2) The manufacturer, importer, or authorised representative of a product must not use the verification tolerances as allowed tolerances to establish the declared values.

#### Table 14

### Verification tolerances

<i>Parameter</i>	<i>Sample size</i>	<i>Verification tolerances</i>
<b>Full-load on-mode power <math>P_{on}</math> [W]:</b>		
$P_{on} \leq 2W$	10	The determined value must not exceed the declared value by more than 0.20W.
$2W < P_{on} \leq 5W$	10	The determined value must not exceed the declared value by more than 10%.
$5W < P_{on} \leq 25W$	10	The determined value must not exceed the declared value by more than 5%.
$25W < P_{on} \leq 100W$	10	The determined value must not exceed the declared value by more than 5%.
$100W < P_{on}$	10	The determined value must not exceed the declared value by more than 2.5%.
Displacement factor [ $\theta$ -I]	10	The determined value must not be less than the declared value minus 0.1 units.
Useful luminous flux $\Phi_{use}$ [lm]	10	The determined value must not be less than the declared value minus 10%.
Standby power $P_{sb}$ and networked standby power $P_{net}$ [W]	10	The determined value must not exceed the declared value by more than 0.10W.
CRI and R9 [0-100]	10	The determined value must not be less than the declared value by more than 2.0 units.
Flicker [ $P_{st}$ LM] and stroboscopic effect [SVM]	10	The determined value must not exceed the declared value by more than 10%.
Colour consistency [MacAdam ellips steps]	10	The determined number of steps must not exceed the declared number of steps. The centre of the MacAdam ellipse must be the centre declared by the supplier with a tolerance of 0.005 units.
Beam angle (degrees)	10	The determined value must not deviate from the declared value by more than 25%.
Total mains efficacy $\eta_{TM}$ [lm/W]	10	The determined value (quotient) must not be less than the declared value minus 5%.
Lumen maintenance factor (for LED and OLED)	10	The determined $X_{LMF}$ % of the sample must not be less than $X_{LMF, MIN}$ % in accordance with the test in Schedule 5.
Survival factor (for LED and OLED)	10	At least 9 light sources of the test sample must be operational after completing the endurance test in Schedule 5.
Lumen maintenance factor (for FL and HID)	10	The determined value must not be less than 90% of the declared value.
Survival factor (for FL and HID)	10	The determined value must not be less than the declared value.
Excitation purity [%]	10	The determined value must not be less than the declared value minus 5%.
Correlated colour temperature [K]	10	The determined value must not deviate from the declared value by more than 10%.
Luminous peak intensity [cd]	10	The determined value must not deviate from the declared value by more than



		25%.
--	--	------

(3) For light sources with linear geometry which are scalable but of very long length, such as LED strips or strings, verification testing must 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 must indicate which separate control gear is suitable for this length.

(4) When verifying if a product is a light source, the market surveillance authority must compare the measured values for—

- (a) chromaticity coordinates (x and y);
- (b) luminous flux;
- (c) luminous flux density; and
- (d) colour rendering index,

directly with the limit values set out in the definition for light source in regulation 3(1), without applying any tolerances.

(5) If any of the 10 units in the sample satisfies the conditions for being a light source, the product model must be considered to be a light source.

(6) Light sources that allow the end-user to control, manually or automatically, directly or remotely—

- (a) the luminous intensity;
- (b) colour;
- (c) correlated colour temperature;
- (d) spectrum; or
- (e) beam angle,

of the emitted light, must be tested using the reference control settings.

#### **EXPLANATORY NOTE**

*(This note is not part of the Regulations)*

These Regulations specify ecodesign requirements for light sources and separate control gears, and energy labelling requirements for light sources.

Part 1 contains introductory provisions.

Chapter 1 of Part 2 contains interpretation provisions for this Part. Chapter 2 sets out the ecodesign requirements for light sources and separate control gears. These provisions are an implementing measure for the purposes of the Ecodesign for Energy-Related Products Regulations 2010 (as amended), and are based on EU Regulation 2019/2020 which specifies ecodesign requirements for light sources and separate control gears in the EU.

Chapter 3 of Part 2 sets out energy labelling requirements for light sources. These provisions are a product-specific measure for the purposes of EU Regulation 2017/1369 setting a framework for energy labelling, and are based on EU Regulation 2019/2015 which specifies energy labelling requirements for light sources in the EU.

Part 3 specifies requirements for reviewing these Regulations, and makes consequential amendments and revocations.