

SCHEDULE 3

Regulations 2(10), 4 and 7(2)

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 Φ_{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 (η in lm/W) and end loss factor (L in W) are as specified in Table 2, according to the light source type;
- (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 3;
- (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 2**Threshold efficacy (η) and end loss factor (L)**

<i>Light source description</i>	η	L
<i>(lm/W)</i>	<i>(W)</i>	
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 1st September 2023, for FL T8 of 2-, 4- and 5-foot	120.0	1.5
Magnetic induction light source, any length or 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

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<i>Light source description</i>	η	L
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
Before 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 3

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>Addition 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 source (HLLS)	+ 0.0058 · Luminance-HLLS – 0.0167

(2) For the purposes of this paragraph—

- (a) where applicable, additions on correction factor C are cumulative;
- (b) the addition 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, resulting in changes to 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 4.

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 4.

Table 4

Minimum energy efficiency for separate control gear at full-load

<i>Declared output power of the control gear (P_{cg}) or declared power of the light source (P_{ls}) in W, as applicable</i>	<i>Minimum energy efficiency</i>
Control gear for HL light sources all wattages P_{cg}	0.91
Control gear for FL light sources $P_{ls} \leq 5$ $5 < P_{ls} \leq 100$ $100 < P_{ls}$	0.71 $P_{ls}/(2 \times \sqrt{(P_{ls}/36) + 38/36 \times P_{ls} + 1})$ 0.91
Control gear for HID light sources $P_{ls} \leq 30$ $30 < P_{ls} \leq 75$ $75 < P_{ls} \leq 105$ $105 < P_{ls} \leq 405$ $405 < P_{ls}$	0.78 0.85 0.87 0.90 0.92
Control gear for LED or OLED light sources all wattages P_{cg}	$P_{cg}^{0.81}/(1.09 \times P_{cg}^{0.81} + 2.10)$

(2) For the purposes of this paragraph, the requirements of Table 4 apply to multi-wattage separate control gears in respect of the maximum declared power on which they can operate.

(3) 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 0.5W.

(4) The standby power P_{sb} of a separate control gear must not exceed 0.5 W.

(5) For a connected separate control gear—

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- (a) the networked standby power P_{net} must not exceed 0.5 W;
- (b) the allowable values for P_{sb} and P_{net} must not be added together.
- (6) This paragraph is subject to the exemptions in paragraph 3(3) of Schedule 4.

Functional requirements

- 3. The functional requirements specified in Table 5 apply to light sources.

Table 5

Functional requirements for light sources

Colour rendering	$\text{CRI} \geq 80$ (except for HID with $\Phi_{\text{use}} > 4 \text{ klm}$ and for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a $\text{CRI} < 80$, 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 $P_{\text{on}} \leq 5 \text{ W}$; $\text{DF} \geq 0.5$ at $5 \text{ W} < P_{\text{on}} \leq 10 \text{ W}$; $\text{DF} \geq 0.7$ at $10 \text{ W} < P_{\text{on}} \leq 25 \text{ W}$; $\text{DF} \geq 0.9$ at $25 \text{ W} < P_{\text{on}}$
Lumen maintenance factor (for LED and OLED)	The lumen maintenance factor $X_{\text{LMF}}\%$ after endurance testing in accordance with Schedule 5 must be at least $X_{\text{LMF,MIN}}\%$ calculated as follows— $X_{\text{LMF,MIN}}\% = 100 \times e^{\frac{(3000 \times \ln(0.7))}{L_{70}}}$ where L_{70} is the declared $L_{70}B_{50}$ lifetime (in hours). If the calculated value for $X_{\text{LMF,MIN}}$ exceeds 96.0%, an $X_{\text{LMF,MIN}}$ 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 2, Table 1, 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	$P_{\text{st}} \text{ LM} \leq 1,0$ at full-load
Stroboscopic effect for LED and OLED MLS	Before 31st August 2024: $\text{SVM} \leq 0.9$ at full-load (except for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a $\text{CRI} < 80$);

From 1st September 2024:

$SVM \leq 0.4$ at full-load (except for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a $CRI < 80$)

Information requirements

4. The following information requirements apply.

Light sources

5.—(1) The following information must be displayed on light sources when they are placed on the market.

- (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 ($^{\circ}$) must also be displayed in a legible font on the surface, provided that the condition set out in sub-paragraph 2 regarding the availability of sufficient space is met.

(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; and
- (b) in 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 (Φ_{use}), in a font at least twice as large as the display of the on-mode power (P_{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_{on}), expressed in W;
 - (g) the standby power (P_{sb}), expressed in W and rounded to the second decimal, unless the value is zero, in which case it may be omitted;
 - (h) the networked standby power (P_{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⁽¹⁾, (without prejudice to the marking obligations in regulation 22 of those Regulations); 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 sub-paragraph (2) may be provided—
- (a) in writing (which does not need to use the exact wording of the requirements in sub-paragraph (2));

(1) S.I. 2013/3113.

- (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) 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 as a percentage;
- (e) the—
 - (i) no-load power (P_{no}), expressed in W and rounded to the second decimal, unless the value is zero in which case this may be omitted; or
 - (ii) indication that the gear is not intended to operate in no-load mode;
- (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;
- (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;
- (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 sub-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.

(4) Where information is omitted from the packaging in accordance with sub-paragraph (2)(e), (f) or (g), the omitted information must be provided in the technical documentation and on the website of the manufacturer, authorised representative or importer.

Websites

8.—(1) For any separate control gear that is placed on the market, the information listed in sub-paragraph (2) must be—

- (a) available on a website of the manufacturer, authorised representative or importer; and
- (b) accessible to the public without charge.

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

- (a) the information specified in paragraph 7(2), including the information omitted from the packaging in accordance with paragraph 7(2)(e), (f) or (g) but excluding the information specified in paragraph 7(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; and
 - (ii) 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 listed in sub-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) The technical documentation required for the conformity assessment of the product must comply with the following.

(2) The information listed in paragraph 8(2) must also be contained in the technical documentation.

(3) Where the information in the technical documentation for a particular product 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;
- (b) by calculation on the basis of design or extrapolation from another model of the same or a different manufacturer; or
- (c) by both paragraphs (a) and (b),

the technical documentation must include the details of any such calculation and 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 all the information specified in Schedule 9, and this must be provided in the order and in the format set out in that Schedule.

Information for products specified in paragraph 3 of Schedule 4

10.—(1) For the light sources and separate control gears specified in paragraph 3(2) of Schedule 4—

- (a) the technical documentation 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) In relation to light sources referred to in paragraph 3(2)(p) of Schedule 4, the technical documentation and all forms of packaging, product information and advertisement must also contain the following statement—

“This light source is for use only by photosensitive patients. Use of this light source will lead to increased energy costs compared to an equivalent more energy efficient product.”

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

Reference control settings

11.—(1) Subject to the following provisions of this paragraph, the reference control settings must be those predefined by the manufacturer as factory default values and encountered by the user at first installation (initial values).

(2) 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) is treated as the initial value.

(3) If the initial 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 as to why the initial value is set differently from the reference control setting.

(4) The manufacturer must define the reference control settings such that—

- (a) where the range of potential settings includes the option for the reference control settings to be defined in such a way that the light source does not have the optical characteristics specified in regulation 2(2), that option is not exercised;

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- (b) lighting control parts and non-lighting parts are disconnected or switched-off or, where this is not possible, the power consumption of these parts is minimal;
 - (c) the full-load condition is obtained; and
 - (d) when the user opts to reset factory defaults, the reference control settings are obtained.
- (5) For light sources which allow the manufacturer of a containing product to make implementation choices that influence light source characteristics (for example, definition of the operating current, thermal design) and cannot be controlled by the user, the reference control settings are not required to be defined.
- (6) Where sub-paragraph (5) applies, the test conditions used by the light source manufacturer are to be used for the purposes of checking whether a light source conforms to these Regulations.