Annex 1

Technical Definitions

For this regulation, the following definitions shall apply:

1) **'light source'** means an electrically operated product intended to emit, or, in the case of a non-incandescent light source, intended to be possibly tuned to emit, light, or both, with all of the following optical characteristics:
   (a) chromaticity coordinates x and y in the range:
   0,270 < x < 0,530; and
   $-2{,}3172\ x^2 + 2{,}3653\ x - 0{,}2199 < y < -2{,}3172\ x^2 + 2{,}3653\ x - 0{,}1595$;
   (b) a luminous flux < 500 lumen per mm2 of projected light-emitting surface area.
   (c) a luminous flux between 60 and 82 000 lumens; (d) a colour rendering index (CRI) > 0; using incandescence, fluorescence, high-intensity discharge, inorganic light-emitting diodes (LED) or organic light-emitting diodes (OLED), or their combinations as lighting technology.

   High-pressure sodium (HPS) light sources that do not fulfil condition (a) are considered light sources for this regulation. Light sources do not include:
   (a) LED dies or LED chips;
   (b) LED packages;
   (c) Products containing a 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.
2) **'control gear'** means one or more devices that may or may not be physically integrated with a light source, intended to prepare the mains for the electric format required by one or more specific light sources within boundary conditions set by electrical safety and electromagnetic compatibility. It may include transforming the supply and starting voltage, limiting operational and preheating current, preventing cold starting, correcting the power factor and/or reducing radio interference.
   The term 'control gear' does not have power supplies and also does not include lighting control parts and non-lighting parts.

3) **'light'** means electromagnetic radiation with a wavelength between 380 nm and 780 nm;
4) **'LED die' or 'LED chip'** means a small block of light-emitting semiconducting material on which a functional LED circuit is fabricated;
5) **'LED package'** means a single electric part comprising principally at least one LED die. It does not include a control gear or parts of it, a cap or active electronic components and is not connected directly to the mains voltage. It can consist of one or more of the following: optical elements, light converters (phosphors), thermal, mechanical and electric interfaces or parts to address electrostatic discharge concerns. Any similar light-emitting devices that are intended to be used directly in an LED luminaire, are considered to be light sources;
6) **'chromaticity'** means the property of a colour stimulus defined by its chromaticity coordinates (*x* and *y*);
7) **'Luminous flux'** or 'flux' (Φ), expressed in the lumen (lm), means the quantity derived from bright flux (radiant power) by evaluating the electromagnetic radiation by the spectral sensitivity of the human eye. It refers to the total flux emitted by a light source in a solid angle of 4 steradians under conditions (e.g. current, voltage, temperature) specified in applicable standards. It refers to the initial flux for the undimmed light source after a short operating period, unless it is specified that the flux in a dimmed condition or the flux after a given period of operation is intended.
8) **'colour rendering index' (CRI)** means a metric quantifying the effect of an illuminant on the colour appearance of objects by conscious or subconscious comparison with their colour appearance under the reference illuminant and is the average Ra of the colour rendering for the first 8 test colours (R1-R8) defined in standards;
9) **'incandescence'** means the phenomenon where light is produced from heat, in light sources typically delivered through a threadlike conductor ('filament') which is heated by the passage of an electric current;
10) **'halogen light source'** means an incandescent light source with a threadlike conductor made from tungsten surrounded by gas containing halogens or halogen compounds;
11) **'Fluorescence' or 'fluorescent light source' (FL)** means the phenomenon of a light source using an electric gas discharge of the low-pressure mercury type in which most of the light is emitted by one or more layers of phosphors excited by the ultraviolet radiation

from the discharge. Fluorescent light sources may have one ('single-capped') or two ('double-capped') connections ('caps') to their electricity supply. For this regulation, magnetic induction light sources are also considered as fluorescent light sources;

12) **'high-intensity discharge' (HID)** means an electric gas discharge in which the light-producing arc is stabilized by wall temperature and the arc chamber has a bulb wall loading over 3 watts per square centimetre. HID light sources are limited to metal halide, high- pressure sodium and mercury vapour types;

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

14) **'Inorganic light-emitting-diode'(LED)** means a technology in which light is produced from a solid-state device embodying a p-n junction of inorganic material. The junction emits optical radiation when excited by an electric current;

15) **'organic light-emitting diode' (OLED)** means a technology in which light is produced from a solid-state device embodying a p-n junction of organic material. The junction emits optical radiation when excited by an electric current;

16) **'high-pressure-Sodium light source' (HPS)** means a high-intensity discharge light source in which the light is produced mainly by radiation from Sodium vapour operating at a partial pressure of the order of 10 kilopascals. HPS light sources may have one ('single-ended') or two ('double-ended') connectors to their electricity supply;

17) **'directional light source' (DLS)** means a light source having at least 80% of total luminous flux within a solid angle of a sr (corresponding to a cone with an angle of 120°);

18) **'non-directional light source' (NDLS)** means a light source that is not a directional light source;

19) **'mains light source (MLS)'** means a light source that can be operated directly on the mains electricity supply. Light sources that operate directly on the mains, and can also operate indirectly on the mains using a separate control gear, shall be considered to be mains light sources;

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

21) **'luminance'** (in a given direction, at a given point of a real or imaginary surface) means the luminous flux transmit- ted by an elementary beam passing through the given point and propagating in the solid angle containing the given direction divided by the area of a section of that beam containing the given point (cd/m2);

22) **'Average luminance'** (Luminance-HLLS) for a LED light source means the average luminance over a light-emitting area where the luminance is more than 50% of the peak luminance (cd/mm^2);

23) **'lighting control parts'** means parts that are integrated with a light source, or physically separated but marketed together with a light source as a single product, that is not strictly necessary for the light source to emit light at full load. But, that enable manual or automatic, direct or remote, control of the luminous intensity, chromaticity, correlated colour temperature, the light spectrum and/or beam angle. Dimmers shall also be considered as lighting control parts.

24) **'non-lighting parts'** means parts that are integrated with a light source, or physically separated but marketed together with a light source as a single product, that are not necessary for the light source to emit light at full-load, and that are not 'lighting control parts'. Examples include, but is not limited to: speakers (audio), cameras, repeaters for communication signals to extend the range (e.g. WiFi), parts supporting grid balance (switching to own internal batteries when necessary), battery charging, visual notification of events (mail arriving, doorbell ringing, alert), use of Light Fidelity (Li-Fi, a bidirectional, high-speed and fully networked wireless communication technology).

    The term also includes data-connection parts used for other functions than to control the light emission function;

25) **'useful luminous flux' (Φuse)** means the part of the luminous flux of a light source that is considered when determining its energy efficiency:

    - for non-directional light sources, it is the total flux emitted in a solid angle of 4π sr (corresponding to a 360°sphere);
    - for directional light sources with beam angle ≥ 90° it is the flux emitted in a solid angle of π sr (corresponding to a cone with an angle of 120°);

- for directional light sources with beam angle < 90° it is the flux emitted in a solid angle of 0,586π sr (corresponding to a cone with an angle of 90°); 'full-load' means the condition of a light source, within the declared operating conditions, in which it emits the maximum (undimmed) luminous flux;

26) **'standby mode'** means the condition of a light source, where it is connected to the power supply, but the light source is intentionally not emitting light, and the light source is awaiting a control signal to return to a state with light emission. Lighting control parts enabling the standby function shall be in their control mode. Non-lighting parts shall be disconnected or switched off, or their power consumption shall be minimized following manufacturer's instructions;

27) **'on-mode power' (Pon)** expressed in watt, means the electric power consumption of a light source in full-load with all lighting control parts and non-lighting parts disconnected. If these parts cannot be disconnected, they shall be switched off, or their power consumption shall be minimized following the manufacturer's instructions. In case of an NMLS that requires a separate control gear to operate, Pon can be measured directly on the input to the light source, or Pon is determined using a control gear with known efficiency, whose electric power consumption is subsequently subtracted from the measured mains power input value;

28) **'standby power' (Psb)** expressed in watt, is the electric power consumption of a light source in standby mode;

29) **'networked standby power' (Pnet)** expressed in watt, is the electric power consumption of a CLS in networked standby mode;

30) **'Reference control settings' (RCS)** means a controlled setting or a combination of control settings that are used to verify compliance of a light source with this regulation. These settings are relevant for light sources that allow the end-user to control, manually or automatically, directly or remotely, the luminous intensity, colour, correlated colour temperature, spectrum, and/or beam angle of the emitted light. In principle, the reference control settings shall be those predefined by the manufacturer as factory default values and encountered by the user at first installation (out-of-the-box values). If the installation procedure provides for an automatic software update during the first installation, or if the

user has the option to perform such an update, the resulting change in settings (if any) shall be taken into account.

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

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

31) **'high-pressure mercury light source'** means a high-intensity discharge light source in which the significant portion of the light is produced, directly or indirectly, by radiation from predominantly vaporized mercury operating at a partial pressure over 100 kilopascals;

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

33) **'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 fundamentally shaped as connected multiple parallel tubes, with or without a second bulb-like envelope. CFLs are available with (CFLi) or without (CFLni) physically integrated control gear;

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

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

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

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

38) **'colour rendering' (Ra)** means the effect of an illuminant on the colour appearance of objects by conscious or subconscious comparison with their colour appearance under a reference illuminant;

39) **'R9'** means the colour rendering index for a red coloured object as defined in standards;

40) **'luminous intensity'** (candela or cd) means the quotient of the luminous f lux leaving the source and propagated in the element of solid angle containing a given direction, by the element of solid angle;

41) **'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;

42) **'colour consistency'** means the maximum deviation of the initial (after a short period), 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);

43) **'lumen maintenance factor' (XLMF)** means the ratio of the luminous flux emitted by a light source at a given time in its life to the initial luminous f lux;

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

45) **'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. This is also referred to as the L70B50 lifetime;

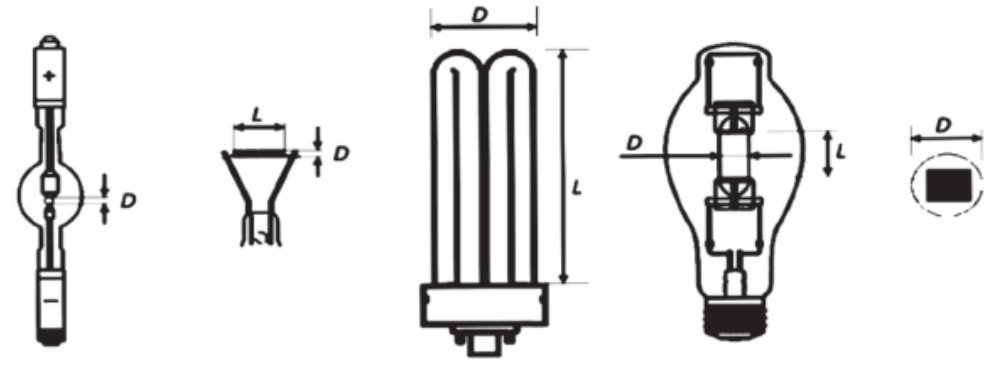
46) **'display mechanism'** means any screen, including tactile screen, or other visual technology used for displaying internet content to users;

47) **'projected light-emitting surface area'** (A) is the surface area in mm2 (square millimetres) of the view in an orthographic projection of the light-emitting surface from the direction with the highest light intensity, where the light-emitting surface area is the surface area of the light source that emits light with the declared optical characteristics, such as the approximately spherical surface of an arc (a), cylindrical surface of a filament coil (b) or a gas discharge lamp (c, d), flat or semi-spherical envelope of a light-emitting diode (e).

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

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

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



48) Containing Product means a product containing one or more light sources, or separate control gears, or both. Examples of containing products are luminaires that can be taken apart to allow separate verification of the contained light source(s), household appliances containing light source(s), furniture (shelves, mirrors, display cabinets) containing light source(s).

49) An 'integrated product' refers exclusively to LED luminaires i.e. where a light source or gear is physically installed and where the light source/gear cannot be physically removed by the customer.

Annex 2

The Energy Efficiency Stars and Calculation Method

1- energy efficiency of light sources

$$\eta_{TM} = (\phi use/Pon) \times F_{TM} \text{ (lm/W)}.$$

Table 1

The energy efficiency of light sources

Energy efficiency class	Total mains efficacy η_{TM} (lm/W)
5 stars	$210 \leq \eta_{TM}$
4 stars	$160 \leq \eta_{TM} < 210$
3 stars	$110 \leq \eta_{TM} < 160$
2 stars	$85 \leq \eta_{TM} < 110$
1 stars	$50 \leq \eta_{TM} < 85$

Table 2

Factors (F_{TM}) by light source type

Light source type	Factor F_{TM}
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

2- Energy efficiency requirements of a separate control gear

The values set in Table 3 for the minimum energy efficiency requirements of a separate control gear operating at full-load shall apply.

Table 3

Minimum energy efficiency for separate control gear at full-load

Declared output power of the control gear (Pcg) or declared power of the light source (Pls) in W, as applicable	**Minimum energy efficiency**
Control gear for HL light sources all wattages Pcg	0,91
Control gear for FL light sources	
Pls ≤ 5	0,71
5<Pls ≤100	Pls/(2x $\sqrt{}$ (Pls/36) + 38/36 ×Pls+1)
100 < Pls	0,91
Control gear for HID light sources	
Pls ≤ 30	0,78
30 < Pls ≤75	0,85
75<Pls≤ 105	0,87
105 <Pls≤ 405	0,90
405 < Pls	0,92
Control gear for LED or OLED light sources all wattages Pcg	Pcg 0,81/(1,09 × Pcg0,81 +2,10)

- Multi-wattage separate control gears shall comply with the requirements in Table 3 according to the maximum declared power on which they can operate.
- The no-load power Pno of a separate control gear shall not exceed 0,5 W. This applies only to separate control gear for which the manufacturer has declared in the technical documentation that is designed for no-load mode.
- The standby power Psb of a separate control gear shall not exceed 0,5 W.
- The networked standby power Pnet of a connected separate control gear shall not exceed 0,5 W. The allowable values for Psb and Pnet shall not be added together

Annex 3

Exemptions

For non-directional household lamps, luminaires and control gears UAE Cabinet Decision No 34 of 2013 for Lighting Products is applied.

1. This regulation shall not apply to light sources specifically tested and approved to operate:
    - For radiological and nuclear medicine installations.
    - For emergency use.
    - For military or civil defense establishments, equipment, ground vehicles, marine equipment or aircraft.
    - For motor vehicles, and their trailers.
    - For non-road mobile machinery and their trailers.
    - For civil aviation aircraft.
    - For railway vehicle lighting.
    - For marine equipment.
    - For medical devices and in-vitro medical devices
2. Besides, this regulation shall not apply to:
    - Electronic displays (televisions, computer monitors, notebooks, tablets, mobile phones, e-readers, game consoles).
    - Light sources in range hoods.
    - Light sources in battery-operated products, including torches, mobile phones with an integrated torchlight, toys including light sources, desk lamps operating only on batteries, armband lamps for cyclists, solar-powered garden lamps;
    - Light sources on bicycles and other non-motorized vehicles;
    - Light sources for spectroscopy and photometric applications, such as UV-VIS spectroscopy, molecular spectroscopy, atomic absorption spectroscopy, nondispersive infrared (NDIR), Fourier-transform infrared (FTIR), medical analysis, layer thickness measurement, process monitoring or environmental monitoring.
3. Any light source specifically designed and marketed for use in at least one of the following applications:

- Signalling (including, but not limited to, road, railway, marine or air traffic- signalling, traffic control or airfield lamps);
- Image capture and image projection (including, but not limited to, photocopying, printing (directly or in pre-processing), lithography, film and video projection, holography);
- Light sources with specific effective ultraviolet power > 2 mW/klm and intended for use in applications requiring high UV-content;
- Light sources with peak radiation around 253,7 nm and intended for germicidal use;
- Light sources emitting 5% or more of total radiation power of the range 250- 800 nm in the range of 250-315 nm and/or 20% or more of total radiation power of the range 250-800 nm in the range of 315-400 nm, and intended for disinfection or f fly trapping;
- Light sources having the primary purpose of emitting radiation around 185,1 nm and designed to be used for the generation of ozone;
- 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;
- 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;
- 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;
- Light sources with a photosynthetic efficacy > 1,2 µmol/J, and/or emitting 25 % or more of total radiation power of the range 250-800 nm in the range of 700-800 nm, and intended for use in horticulture.

Annex 4

Functionality Requirements

The lamp functionality requirements are set out in Table 4

Table 4

Functional requirements for light sources

Parameter	**Functionality Requirements and endurance requirements for LED lamps**	**Functionality requirements for directional compact fluorescent lamps**	**Functionality requirements for other directional lights (excluding LED lights, compact fluorescent lamps and high-intensity discharge lamps)**
Rated lamp life at 50% lamp survival			≥ 2 000 h ≥ 4 000 h for extra- low voltage lamps
Lamp survival factor at 2,000 h	≥ 0.90	≥ 0,70	
Lumen Maintenance	at 2000 h ≥0.80	At 2 000 h: ≥ 83% At 6 000 h: ≥ 70%	≥ 80% at 75% of rated average lifetime
Number of switching cycles before failure	≥ 15,000 if rated lamp life ≥ 30,000 h otherwise: ≥half the rated lamp life expressed in hours	≥ lamp lifetime expressed in hours ≥ 30 000 if lamp starting time > 0,3s	≥ lamp lifetime expressed in hours
Starting time	< 0.5 s	< 1,5 s if P < 10 W < 1,0 s if P≥ 10 W	< 1 s
Lamp warm-up time	to 95% Φ <2s	to 60% Φ < 40 s or <100 s for lamps containing mercury in amalgam form	to 60% ≤ 40 s
Premature failure rate	≤5.0% at 1,000 h	≤5,0% at 1000 h	≤5,0% at 200 h

Colour rendering (Ra)	≥ 80 ≥ 65 if the lamp is intended for outdoor or industrial applications	≥ 80 ≥ 65 if the lamp is intended for outdoor or industrial applications	
Colour consistency	Variation of chromaticity coordinates within a six- step MacAdam ellipse or less.		
Lamp power factor (Pf) for lamps with integrated control gear and integrated luminaires	P≤ 2 W: no requirement 2W<P≤5W: Pf > 0.4 5 W<P≤25 W: Pf > 0.7 P > 25 W: Pf > 0.9	≥ 0,55 if P < 25 W ≥ 0,90 if P ≥ 25 W	Power > 25 W: ≥ 0,9 Power ≤ 25 W: ≥ 0,5

Annex 5

Hazardous Chemicals: Substance Restrictions for Lamps and Control Gears

The limits for hazardous substances in UAE cabinet Decree No. 34 of 2013 are applied except the limit on mercury content for single and double capped fluorescent lamps (without integrated ballast) and high-intensity discharge lamps for general lighting purposes per lamp. All other types of lamps in this regulation shall not have mercury limits.

Table 5

Maximum mercury content

Lamp type	Limit
Mercury in single capped (compact) fluorescent lamps	
>30 W and <150 W	5.0 mg
<30 W	2.5 mg
<30 W with long lifetime (> 15,000 h)	3.5 mg
With circular or square structural shape or other non-linear with tube diameter ≤ 17 mm	7.0 mg
Mercury in double-capped linear fluorescent lamps	
Tri-band phosphor with normal lifetime and a tube diameter < 9 mm (e.g. T2)	5.0 mg
Tri-band phosphor with normal lifetime and a tube diameter ≥ 9 mm and ≤ 17 mm (e.g. T5)	5.0 mg
Tri-band phosphor with normal lifetime and a tube diameter > 17 mm and 28 mm (e.g. T8)	8.0 mg
Tri-band phosphor with normal lifetime and a tube diameter > 28 mm (e.g. T12)	5.0 mg
Tri-band phosphor with long lifetime (≥ 25,000 h) and T8 halophosphate	8.0 mg
Mercury in other fluorescent lamps	
Non-linear halophosphate lamps (all diameters)	15 mg
Non-linear tri-band phosphor lamps with tube diameter > 17 mm (e.g. T9)	15 mg
Lamps for other general lighting and special purposes (e.g. induction lamps)	15 mg

T12 linear halophosphate lamps	10 mg
Mercury in other low-pressure discharge lamps	15 mg
Mercury in high-pressure sodium (vapour) lamps for general lighting purposes with improved colour rendering index Ra > 60	
P≤ 155 W	30 mg
155 W<P< 405 W	40 mg
P > 405 W	40 mg
Mercury in other high-pressure sodium (vapour) lamps for general lighting	
P≤ 155 W	25 mg
155 W<P< 405 W	30 mg
P > 405 W	40 mg
Mercury in metal halide lamps (MH)	no limit
Mercury in other discharge lamps for special purposes not specifically mentioned in this Annex	no limit
Note: Maximum mercury content limits for lamps (per burner) in the scope of this regulation (only applies to single capped fluorescent lamps without integrated ballast and high-intensity discharge lamps for general lighting purposes)	

Table 6 outlines exemptions to the hazardous substance limits set in this Annex. Eligible products or components have no limit on the levels of the relevant hazardous substance.

Table 6

Lamps exempted from hazardous substance limits listed in UAE cabinet Decree No. 10 of 2017

Description	Requirements
Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezo-electronic devices, or in a glass or ceramic matrix compound	No limit
Lead in dielectric ceramic in capacitors for a rated voltage of 125V AC or 250V DC or higher	No limit
Lead in glass of fluorescent tubes not exceeding 0.2% by weight	No limit
Cadmium and its compounds in electrical contacts	No limit
Lead as an alloying element in aluminium containing up to 0.4% lead by weight	No limit
A copper alloy containing up to 4% lead by weight	No limit
Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead)	No limit
Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda-lime glasses	No limit

Annex 6

1. Product information

1.1 Product information sheet

The supplier shall enter into the product database the information as set out in Table7, including when the light source is a part in a containing product.

Table 7

Product information sheet

Supplier's name or trademark:

Supplier's address:

Model identifier:

Type of light source:

Lighting technology used:	[HL/LFL T5 HE/LFL T5 HO/CFLni/other FL/HPS/MH/other HID/LED/OLED/ mixed/other]	Non-directional or directional:	[NDLS/DLS]
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/	X	Energy efficiency class	[A/B/C/D/E/F/G] (*)
Useful luminous flux (Φuse), 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 100 K, or the range of correlated colour temperatures, rounded to the nearest 100 K, 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	x,xx
Networked standby power (P_{net}) for CLS, expressed in W and rounded to the second decimal	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	[graphic]
	Width	x		
	Depth	x		
Claim of equivalent power ([c])		[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,x
the lumen maintenance factor	x,xx		

Parameters for LED and OLED mains light sources:

displacement factor (cos φ1)	x,xx	Colour consistency in McAdam ellipses	x

(a) "-"not applicable;

Claims that an LED light source replaces a fluorescent light source without integrated ballast of a particular wattage.	[yes/-] ([b])	If yes then replacement claim (W)	x
Flicker metric (Pst LM)	x,x	Stroboscopic effect metric (SVM)	x,x

'yes': An equivalence claim involving the power of a replaced light source type may be given only:

- for directional light sources, if the light source type is listed in Table 8 and if the luminous flux of the light source in a 90° cone ($\Phi_{90°}$) is not lower than the corresponding reference luminous flux in Table 8. The reference luminous flux shall be multiplied by the correction factor in Table 9. For LED light sources, it shall be in addition multiplied by the correction factor in Table 10;
- for non-directional light sources, the claimed equivalent incandescent light source power (rounded to 1 W) shall be that corresponding in Table 11 to the luminous flux of the light source.

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

([b]): not applicable;

Yes': Claim that a LED light source replaces a fluorescent light source without integrated ballast of a particular wattage. This claim may be made only if:

- 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

Table 8

Reference luminous f lux for equivalence claims

Extra-low voltage reflector type

T	Power (W)	Reference Φ_{90o} (lm)
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 ref lector type

T	Power	Reference Φ_{90o} (lm)
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

Type	Power (W)	Reference Φ_{90o} (lm)
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 9

Multiplication factors for lumen maintenance

Light source type	Luminous flux multiplication factor
Halogen light sources	1
Fluorescent light sources	1,08
LED light sources	1+0,5×(1 -LLMF) Where LLMF is the lumen maintenance factor at the end of the declared lifetime

Table 10

Multiplication factors for LED light sources

LED light source beam angle	Luminous flux multiplication factor
20°≤ beam angle	1
15°≤ beam angle < 20°	0,9
10°≤ beam angle < 15°	0,85
beam angle < 10°	0,80

Table 11

Equivalence claims for non-directional light sources

Rated light source luminous flux Φ(lm)	Claimed equivalent incandescent light source power (W)
136	15
249	25
470	40
806	60
1 055	75
1 521	100
2 452	150

3 452	200

Table 12

Minimum efficacy values for T8 and T5 light sources

T8 (26 mm Ø)		T5 (16 mm Ø) High Efficiency		T5 (16 mm Ø) High Output	
Claimed equivalent power (W)	Minimum luminous efficacy (lm/W)	Claimed equivalent power (W)	Minimum luminous efficacy (lm/W)	Claimed equivalent power (W)	Minimum luminous efficacy (lm/W)
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				

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 shall be reported at the reference control settings.

1.2 **Information to be displayed in the documentation for a containing product**

- If a light source is placed on the market as a part in a containing product, the technical documentation for the containing product shall clearly identify the contained light source(s), including the energy efficiency stars.
- If a light source is placed on the market as a part in a containing product, the following text shall be displayed, clearly legible, in the user manual or booklet of instructions:

  'This product contains a light source of energy efficiency stars <X>',

Where <X> shall be replaced by the energy efficiency stars of the contained light source.

- If the product contains more than one light source, the sentence can be in the plural, or repeated per light source, as suitable.

1.3 **Information to be displayed on the supplier's free access website:**

The reference control settings, and instructions on how they can be implemented, where applicable;

- Instructions on how to remove lighting control parts and/or non-lighting parts, if any, or how to switch them off, or minimize their power consumption;
- If the light source is dimmable: a list of dimmers it is compatible with, and the light source dimmer compatibility standard(s) it is compliant with, if any;
- If the light source contains mercury: instructions on how to clean up the debris in case of accidental breakage;

2. Technical documentation

The technical documentation shall include:

(a) The name and address of the supplier,

(b) 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:

(1) Useful luminous flux (Φ_{use}) in lm;

(2) Colour rendering index (CRI);

(3) On-mode power (Pon) in W;

(4) Beam angle in degrees for directional light sources (DLS);

(5) Correlated colour temperature (CCT) in K for FL and HID light sources;

(6) Standby power (Psb) in W, including when it is zero;

(7) Networked standby power (Pnet) in W for connected light sources (CLS);

(8) Displacement factor (cos φ 1) for LED and OLED mains light sources;

(9) Colour consistency in MacAdam ellipse steps for LED and OLED light sources;

(10) Luminance-HLLS in cd/mm2 (only for HLLS);

(11) F licker metric (PstLM) for LED and OLED light sources;

(12) Stroboscopic effect metric (SVM) for LED and OLED light sources;

(13) Excitation purity, only for CTLS, for the following colours and dominant wavelength within the given range:

Colo	Dominant wavelength
Blue	440 nm 490 nm
Green	520 nm 570 nm
Red	610 nm 670 nm

(f) The calculations performed, including the determination of the energy efficiency

(g) class;

(h) References to the harmonized standards applied or other standards used;

(i) Testing conditions if not described sufficiently in point (g);

(j) The reference control settings, and instructions on how they can be implemented, where applicable;

(k) Instructions on how to remove lighting control parts and/or non-lighting parts, if any, or how to switch them off, or minimize their power consumption during light source testing;

(l) Specific precautions that shall be taken when the model is assembled, installed, maintained or tested.

Annex 7

Verification procedure for market surveillance purposes

The following verification tolerances shall use only for the parameters in Table 13, no other tolerances, such as those set out in standards or in any other measurement method, shall be applied.

Table 13

Verification tolerances

Parameter	Sample size	Verification tolerances
Full-load on-mode power P_{on} [W]:		
$P_{on} \leq 2W$	10	The determined value shall not exceed the declared value by more than 0,20 W.
$2W < P_{on} \leq 5W$	10	The determined value shall not exceed the declared value by more than 10%.
$5W < P_{on} \leq 25W$	10	The determined value shall not exceed the declared value by more than 5%.
$25W \; P_{on} \leq 100W$	10	The determined value shall not exceed the declared value by more than 5%.
$100W < P_{on}$	10	The determined value shall not exceed the declared value by more than 2,5 %.
Displacement factor [0-1]	10	The determined value shall not be less than the declared value minus 0,1 units.
Useful luminous flux Φ_{use} [lm]	10	The determined value shall not be less than the declared value minus 10%.
Total mains efficacy η_{TM} [lm/W]	10	The determined value (quotient) shall not be less than the declared value minus 5%
Luminous peak intensity [cd]	10	The determined value shall not deviate from the declared value by more than 25 %.

Annex 8

Standards Applicable for Lamps and Control Gears

A- Mandatory test methods Standards for lamps and control gears covers with this regulation

1- Directional Halogen incandescent light bulbs and Incandescent light bulbs shall be measured according to methods set out in the following:

Measured parameter	**Directional incandescent light bulbs**	**Directional halogen incandescent light bulbs**
Rated lifetime	UAE.S IEC 60064,	UAE.S IEC 60357,
Lumen maintenance	UAE.S IEC 60064,	UAE.S IEC 60357,
Number of switching cycles	___	___
Starting time	___	___
Lamp warm-up time	___	___
Premature failure rate	UAE.S IEC 60064,	UAE.S IEC 60357
Lamp power factor	___	___
Chromaticity coordinates	CIE S 010 (=ISO 23539) for basics on photometry, CIE 15 for basics on colorimetry, CIE 63 for spectroradiometric measurement	CIE S 010 (=ISO 23539) for basics on photometry, CIE 15 for basics on colorimetry, CIE 63 for spectroradiometric measurement
CRI	___	___
Beam angle	IEC/TR 61341	IEC/TR 61341,
Peak intensity	IEC/TR 61341	IEC/TR 61341,
Lamp type (MR11, GU4,	___	UAE.S IEC 60357

2- Directional Compact fluorescent lamps with integrated control gear and High Intensity Discharge lamps shall be measured according to methods set out in the following:

Measured parameter	**Directional compact fluorescent lamps**	**Directional high intensity discharge lamps**
Rated lifetime	UAE.S IEC 60969	_
Lamp survival factor	UAE.S IEC 60969	_
Lumen maintenance	UAE.S IEC 60969	_
Number of switching cycles	UAE.S IEC 60969	_
Starting time	UAE.S IEC 60969	UAE.S IEC 61167, AnnexeAnnexee A for electro-magnetic operation, AnnexeAnnexee G for square wave operation for metal halide lamps; EN 60662 8.2 for high pressure sodium lamps
Lamp warm-up time	UAE.S IEC 60969	UAE.S IEC 61167, AnnexeAnnexee A for electro-magnetic operation, AnnexeAnnexee G for square wave operation
Premature failure rate	UAE.S IEC 60969	___
Lamp power factor	UAE.S IEC 61000-3-2	UAE.S IEC 61000-3-2 (only for lamps with integrated control gear)

Chromaticity coordinates	CIE 15	CIE 15
CCT	CIE 15	CIE 15
CRI	CIE 13.3	CIE 13.3
Spectral power distribution	CIE 63	CIE 63
Lamp dimensions	UAE.S IEC 60969	UAE.S IEC 61167 for metal halide lamps
Beam angle	IEC/TR 61341	IEC/TR 61341
Peak intensity	IEC/TR 61341	IEC/TR 61341
Lamp type (MR11, GU4, etc.	UAE.S IEC 60968	UAE.S IEC 61167 for metal halide lamps
Cone luminous flux	L2(AP)005	L2(AP)005
Cap	UAE.S IEC 60968	_

3- Directional Light emitting diode lamps and modules shall be measured according to methods set out in the following:

Measured parameter	Directional light emitting diodes lamps	Directional light emitting diodes modules
Rated lifetime	___	
Lamp survival factor	UAE.S IEC 62612, 11.2	IEC 62717, 10.2
Lumen maintenance	UAE.S IEC 62612, 11.2	IEC 62717, 10.2
Number of switching cycles	UAE.S IEC 62612, 11.3.3	IEC 62717, at present 34A/ 1659/CDV, 10.3
Starting time	___	___
Lamp warm-up time	___	___
Premature failure rate	UAE.S IEC 62612, 11.2	IEC 62717, 10.2
Lamp power factor (only for lamps	UAE.S IEC 61000-3-2	UAE.S IEC 61000-3-2
CCT	BS EN 13032-4:2015+A1:2019	BS EN 13032-4:2015+A1:2019
Colour consistency	UAE.S IEC 62612, 10.1	IEC 62717, at present 34A/ 1659/CDV, 9.1 CIE 15
CRI	BS EN 13032-4:2015+A1:2019	BS EN 13032-4:2015+A1:2019
Spectral power distribution	CIE 63	CIE 63
Lamp dimensions	UAE.S IEC 62612, 6	IEC 62717, at present 34A/ 1659/CDV 5

Beam angle	UAE.S IEC 62612, 9.2	IEC 62717, at present 34A. 1659/CDV, 8.2.5 IEC/TR 61341
Peak intensity	UAE.S IEC 62612, 9.2	IEC 62717, at present 34A/ 1659/CDV 8 2 4
Dimmability	UAE.S IEC 62560, 5.2	IEC 62717, at present 34A/ 1659/CDV, 6 and 7.2
Lamp type (MR11, GU4, etc.	See parameter "cap".	
Cone luminous flux	L2(AP)005	L2(AP)005
Cap	UAE.S IEC 62560	

B- List of Standards applicable to Measurements of certain substances

1	UAE.S IEC 62321-1	Measurements of certain substances in electrotechnical products Part 1: Introduction and overview
2	UAE.S IEC 62321-2	Measurements of certain substances in electrotechnical products Part 2: Disassembly, disjunction and mechanical sample preparation
3	UAE.S IEC 62321-3.1	Measurements of certain substances in electrotechnical products Part 3.1 Lead, mercury, cadmium, total chromium and total bromine using X-ray fluorescence spectrometry
4	UAE.S IEC 62321-4	Measurements of certain substances in electrotechnical products Part 4: Mercury in polymers, metals and electronics by CV-AAS, CV- AFS, ICP-OES and ICP-MS
5	UAE.S IEC 62321-5	Measurements of certain substances in electrotechnical products Part 5: Cadmium, lead and chromium in polymers and electronics and cadmium and lead in metals by AAS, AFS, ICP- OES and ICP-MS
6	UAE.S IEC 62321-6	Measurements of certain substances in electrotechnical products Part 6: Polybrominated biphenyls and polybrominated diphenyl ethers in polymers by gas chromatography - mass spectrometry (GC-MS)
7	UAE.S IEC 62554 :2011/AMD1:2017	Sample preparation for measurement of mercury level in fluorescent lamps

C- Additional reference standards

Reference document	Title
UAE.S IEC 60061-1	Lamp caps and holders together with gauges for the control of interchangeability and safety Part 1 lamp caps
UAE.S IEC 60064	Tungsten filament lamps for domestic and similar general lighting purposes Performance requirements
UAE.S IEC 60357	Tungsten halogen lamps (non-vehicle) - Performance specifications
UAE.S IEC 60432-1	Incandescent lamps - Safety specifications - Part 1: Tungsten filament lamps for domestic and similar general lighting purposes
UAE.S IEC 60432-2	Incandescent lamps - Safety specifications - Part 2: Tungsten halogen lamps for domestic and similar general lighting purposes
UAE.S IEC 60432-3	Incandescent lamps - Safety specifications - Part 3: Tungsten halogen lamps (non-vehicle)
UAE.S IEC 60662	High-pressure sodium vapour lamps - Performance specifications
UAE.S IEC 60968	Self-ballasted lamps for general lighting services - Safety requirements
UAE.S IEC 60969	Self-ballasted lamps for general lighting services - Performance requirements
UAE.S IEC 61000-3-2	Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
UAE.S IEC 61167	Metal halide lamps - Performance specification
IEC/TR 61341	Method of measurement of center beam intensity and beam angle(s) of reflector lamps
UAE.S IEC 62442-1	Energy performance of lamp controlgear - Part 1: Controlgear for fluorescent lamps - Method of measurement to determine

	the total input power of controlgear circuits and the efficiency of the controlgear
IEC 62442-2,	Energy performance of lamp controlgear - Part 2: Controlgear for high intensity discharge lamps (excluding fluorescent lamps) - Method of measurement to determine the efficiency of controlgear
IEC 62442-3,	Energy performance of lamp controlgear - Part 3: Controlgear for halogen lamps and LED modules - Method of measurement to determine the efficiency of the controlgear
UAE.S IEC 62471	Photobiological safety of lamps and lamp systems
UAE.S IEC 62554	Sample preparation for measurement of mercury level in fluorescent lamps
UAE.S IEC 62560	Self-ballasted LED lamps for general lighting services by voltage >50 V - Safety specifications
UAE.S IEC 62612	Self-ballasted LED lamps for general lighting services with supply voltages> 50 V- Performance requirements
IEC 62717,	LED modules for general lighting - Performance requirements
BS EN 13032-4:2015+A1:2019	Light and lighting. Measurement and presentation of photometric data of lamps and luminaires. LED lamps, modules and luminaires
CIE TR 13.3:1995	Method of Measuring and Specifying Colour Rendering Properties of Light Sources
CIE TR 15:2004	Colorimetry
CIE 18	Principles of Light Measurement
CIE 43:1979	Photometry of Floodlights
CIE TR 53:1982	Methods of characterizing the performance of radiometers and photometers
CIE 63:1984	The spectroradiometric measurement of light sources
CIE 70:1987	The measurement of absolute luminous intensity distributions
CIE TR 84:1989	The measurement of luminous flux

CIE TR 127:2007	Measurement of LEDs
CIE TR 149:2002	The use of tungsten filament lamps as secondary standard sources
CIE S 010/E:2004/ ISO 23539: 2005	Photometry - The CIE System of Physical Photometry
L2(AP)005,	Cone luminous flux measurement