

TECHNICAL REGULATION ON ECODESIGN REQUIREMENTS FOR NON-DIRECTIONAL HOUSEHOLD LAMPS, NO (XXX) FOR THE YEAR 2012, ISSUED IN ACCORDANCE TO ARTICLE (XXX) AND ARTICLE (XXX) OF STANDARDS AND METROLOGY LAW NO 22/2000

Article 1:

This Technical Regulation shall be referred to as the "Technical Regulation on Eco-design requirements for non-directional household lamps, No. ... for 2012".

Article 2:

This Technical Regulation represents an implementing Technical Regulation to Technical Regulation on ecodesign requirements for energy related products, No. ... for 2012 (hereinafter: Framework Technical Regulation), both of which shall be used to establish the ecodesign requirements for non-directional household lamps.

Section 1
Definitions

Article 3:

3-1 For the purposes of this implementing Technical Regulation, the definitions set out in Framework Technical Regulation shall apply. The following definitions shall also apply:

3-1-1 Household room illumination: the full or partial illumination of a household room, by replacing or complementing natural light with artificial light, in order to enhance visibility within that space;

3-1-2 Lamp: a source made in order to produce an optical radiation, usually visible, including any additional components necessary for starting, power supply or stable operation of the lamp or for the distribution, filtering or transformation of the optical radiation, in case those components cannot be removed without permanently damaging the unit;

3-1-3 Household lamp: a lamp intended for household room illumination; it does not include special purpose lamps;

3-1-4 Special purpose lamp: a lamp not intended for household room illumination because of its technical parameters or because the related product information indicates that it is unsuitable for household room illumination;

3-1-5 Directional lamp: a lamp having at least 80 % light output within a solid angle of π sr (corresponding to a cone with angle of 120°);

3-1-6 Non-directional lamp: a lamp that is not a directional lamp;

3-1-7 Filament lamp: a lamp in which light is produced by means of a threadlike conductor which is heated to incandescence by the passage of an electric current. The lamp may or may not contain gases influencing the process of incandescence;

3-1-8 Incandescent lamp: a filament lamp in which the filament operates in an evacuated bulb or is surrounded by inert gas;

3-1-9 Tungsten halogen lamp: a filament lamp in which the filament is made of tungsten and is surrounded by gas containing halogens or halogen compounds. Tungsten halogen lamps are supplied either with or without integrated power supply;

3-1-10 Discharge lamp: a lamp in which the light is produced, directly or indirectly, by an electric discharge through a gas, a metal vapour or a mixture of several gases and vapours;

3-1-11 Fluorescent lamp: a discharge lamp of the low pressure mercury type in which most of the light is emitted by one or several layers of phosphors excited by the ultraviolet radiation from the discharge. Fluorescent lamps are supplied either with or without integrated ballasts;

3-1-12 Ballast: a device which serves to limit the current of the lamp(s) to the required value in case it is connected between the supply and one or more discharge lamps. It may also include means for transforming the supply voltage, dimming the lamp, correcting the power factor and, either alone or in combination with a starting device, providing the necessary conditions for starting the lamp(s). It can be integrated or external to the lamp;

3-1-13 Power supply: a device which is designed to convert alternating current (AC) power input from the mains power source input into direct current (DC) or another AC output;

3-1-14 Compact fluorescent lamp: a unit which cannot be dismantled without being permanently damaged, provided with a lamp cap and incorporating a fluorescent lamp and any additional components necessary for starting and stable operation of the lamp;

3-1-15 Fluorescent lamp without integrated ballast: a single and double capped fluorescent lamp without integrated ballast;

3-1-16 High intensity discharge lamp: an electric discharge lamp in which the light producing arc is stabilized by wall temperature and the arc has a bulb wall loading in excess of 3 watts per square centimetre;

3-1-17 Light emitting diode or 'LED': a solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current;

3-1-18 LED lamp: a lamp incorporating one or several LED.

3-2 For the purposes of Annexes B to D, the definitions set out in Annex A shall also apply.

Section 2 Subject matter and scope

Article 4:

4-1 This implementing Technical Regulation establishes eco-design requirements for the placing on the market of non-directional household lamps, including when they are marketed for non-household use or when they are integrated into other products. It also establishes product information requirements for special purpose lamps. The requirements set out in this Implementing Technical Regulation shall not apply to the following household and special purpose lamps:

(a) Lamps having the following chromaticity coordinates x and y :

$$- x < 0,200 \text{ or } x > 0,600$$

$$- y < - 2,3172 x^2 + 2,3653 x - 0,2800 \text{ or}$$

$$y > - 2,3172 x^2 + 2,3653 x - 0,1000$$

(b) directional lamps;

(c) lamps having a luminous flux below 60 lumens or above 12 000 lumens;

(d) lamps having:

- 6 % or more of total radiation of the range 250-780 nm in the range of 250-400 nm,
- the peak of the radiation between 315-400 nm (UVA) or 280-315 nm (UVB);

(e) fluorescent lamps without integrated ballast;

(f) high-intensity discharge lamps;

(g) incandescent lamps with E14/E27/B22/B15 caps, with a voltage equal to or below 60 volts and without integrated transformer in Stages 1-5 according to Article 3.

Section 3

Requirements, conformity assessment and market surveillance

Article 5: Ecodesign requirements

5-1 Non-directional household lamps shall meet the eco-design requirements set out in Annex B.

Each ecodesign requirement shall apply in accordance with the following stages:

Stage 1: 1 January 2014,

Stage 2: 1 September 2016.

Unless a requirement is superseded or this is otherwise specified, it shall continue to apply together with the other requirements introduced at later stages.

5-2 Starting from 1 January 2014:

For special purpose lamps, the following information shall be clearly and prominently indicated on their packaging and in all forms of product information accompanying the lamp when it is placed on the market:

- (a) their intended purpose; and
- (b) that they are not suitable for household room illumination.

The technical documentation file, drawn up for the purposes of conformity assessment pursuant to Article 10 of the Framework Technical Regulation, shall list the technical parameters (if any) that make the lamp design specific for the special purpose indicated on the packaging.

Article 6: Conformity assessment

6-1 The conformity assessment procedure referred to in Article 10 of the Framework Technical Regulation shall be the internal design control system set out in Annex B to the Framework Technical Regulation.

6-2 For the purposes of conformity assessment pursuant to Article 10 of Framework Technical Regulation, the technical documentation file shall contain a copy of the product information provided in accordance with Annex B, part 3, to this Implementing Technical Regulation.

Article 7: Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Article 15 of the Framework Technical Regulation, The Organization shall apply the verification

procedure described in Annex C to this Implementing Technical Regulation for the requirements set out in Annex B to this implementing Technical Regulation.

Article 8: Indicative benchmarks

The indicative benchmarks for best-performing products and technology available on the market at the time of adopting this implementing Technical Regulation are identified in Annex D to this implementing Technical Regulation.

Section 4 Related documents

Article 9

9-1 This Technical Regulation represents transposition of EU Regulation 244/2009 on ecodesign requirements for non-directional household lamps.

9-2 Technical Regulation No. ... on the ecodesign requirements for energy related products.

9-3 Standards and Metrology Law No. 22/2000.

9-4 Instructions on market surveillance.

Section 5 Entry into force

Article 10:

This Technical Regulation shall enter into force on 1/1/2013.

ANNEX A

TECHNICAL PARAMETERS COVERED AND DEFINITIONS FOR THE PURPOSES
OF ANNEXES B TO D

1. Technical Parameters for Ecodesign Requirements

For the purposes of compliance and verification of compliance with the requirements of this implementing Technical Regulation, the parameters below shall be established by reliable, accurate and reproducible measurement procedures, which take into account the generally recognised state of the art measurement methods.

(a) 'Lamp efficacy' (η_{lamp}), which is the quotient of the luminous flux emitted (Φ) by the power consumed by the lamp (P_{lamp}): $\eta_{\text{lamp}} = \Phi / P_{\text{lamp}}$ (unit: lm/W). The power dissipated by non-integrated auxiliary equipment, such as ballasts, transformers or power supplies, is not included in the power consumed by the lamp;

(b) 'Lamp lumen maintenance factor' (LLMF), which is the ratio of the luminous flux emitted by the lamp at a given time in its life to the initial (100 hour) luminous flux;

(c) 'Lamp survival factor' (LSF), which is the defined fraction of the total number of lamps that continue to operate at a given time under defined conditions and switching frequency;

(d) 'Lamp lifetime', which is the period of operation time after which the fraction of the total number of lamps which continue to operate corresponds to the lamp survival factor of the lamp, under defined conditions and switching frequency;

(e) 'Chromaticity', which is the property of a colour stimulus defined by its chromaticity coordinates, or by its dominant or complementary wavelength and purity taken together;

(f) 'Luminous flux' (Φ), which is a quantity derived from radiant flux (radiant power) by evaluating the radiation according to the spectral sensitivity of the human eye, measured after 100 hours of lamp running time;

(g) 'Correlated colour temperature' (T_c [K]), which is 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;

(h) 'Colour rendering' (R_a), which is the effect of an illuminant on the colour appearance of objects by conscious or subconscious comparison with their colour appearance under a reference illuminant;

(i) 'Specific effective radiant ultraviolet power', which is the effective power of the ultraviolet radiation of a lamp weighted according to the spectral correction factors and related to its luminous flux (unit: mW/klm);

(j) 'Lamp start time', the time needed, after the supply voltage is switched on, for the lamp to start fully and remain alight;

(k) 'Lamp warm-up time', which is the time needed for the lamp after start-up to emit a defined proportion of its stabilized luminous flux;

(l) 'Power factor', which is the ratio of the absolute value of the active power to the apparent power under periodic conditions;

(m) 'Luminance', which is the amount of light, per unit of apparent surface, that is emitted by or reflected by a particular area within a given solid angle (unit: cd/m²);

(n) 'Lamp mercury content', which is the mercury contained in the lamp and is measured according to the Annex C.

2. Definitions

(a) a 'rated value' is the value of a quantity used for specification purposes, established for a specified set of operating conditions of a product. Unless stated otherwise, all requirements are set in rated values;

(b) a 'nominal value' is the value of a quantity used to designate and identify a product;

(c) 'Second lamp envelope' is a second outer lamp envelope which 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, for protecting from ultraviolet radiation or for serving as a light diffuser;

(d) 'Clear lamp' is a lamp (excluding compact fluorescent lamps) with a luminance above 25 000 cd/m² for lamps having a luminous flux below 2 000 lm and above 100 000 cd/m² for lamps having more luminous flux, equipped with only transparent envelopes in which the light producing filament, LED or discharge tube is clearly visible;

(e) 'Non-clear lamp' is a lamp that does not comply with the specifications under point (d), including compact fluorescent lamps;

(f) 'Switching cycle' is the sequence of switching on and switching off the lamp with defined intervals;

(g) 'Premature failure' is when a lamp reaches its end of life after a period in operation which is less than the rated life time stated in the technical documentation;

(h) 'Lamp cap' means that part of a lamp which provides connection to the electrical supply by means of a socket or lamp connector and, in most cases, also serves to retain the lamp in the socket;

(i) 'Lamp holder' or 'socket' means a device which holds the lamp in position, usually by having the cap inserted in it, in which case it also provides the means of connecting the lamp to the electric supply.

ANNEX B
ECODESIGN REQUIREMENTS FOR NON-DIRECTIONAL HOUSEHOLD LAMPS

1. Lamp Efficacy Requirements

Incandescent lamps with S14, S15 or S19 caps shall be exempted from the efficacy requirements of Stages 1 as defined in Article 5 of this implementing Technical Regulation, but not from Stage 2.

The maximum rated power (P_{max}) for a given rated luminous flux (Φ) is provided in Table 1.

The exceptions to these requirements are listed in Table 2 and the correction factors applicable to the maximum rated power are in Table 3.

Table 1

Application date	Maximum rated power (P_{max}) for a given rated luminous flux (Φ) (W)	
	Clear lamps	Non-clear lamps
Stage 1	$0,8 * (0,88\sqrt{\Phi}+0,049\Phi)$	$0,24\sqrt{\Phi}+0,0103\Phi$
Stage 2	$0,6 * (0,88\sqrt{\Phi}+0,049\Phi)$	$0,24\sqrt{\Phi}+0,0103\Phi$

Table 2

Exceptions

Scope of the correction	Maximum rated power (W)
Clear lamps $60 \text{ lm} \leq \Phi \leq 950 \text{ lm}$ in Stage 1	$P_{max} = 1,1 * (0,88\sqrt{\Phi}+0,049\Phi)$
Clear lamps $60 \text{ lm} \leq \Phi \leq 725 \text{ lm}$ in Stage 2	$P_{max} = 1,1 * (0,88\sqrt{\Phi}+0,049\Phi)$
Clear lamps $60 \text{ lm} \leq \Phi \leq 450 \text{ lm}$ in Stage 3	$P_{max} = 1,1 * (0,88\sqrt{\Phi}+0,049\Phi)$
Clear lamps with G9 or R7s cap in Stage 6	$P_{max} = 0,8 * (0,88\sqrt{\Phi}+0,049\Phi)$

The correction factors in Table 3 are cumulative where appropriate and also applicable to the products covered by the exceptions of Table 2.

Table 3
Correction factors

Scope of the correction	Maximum rated power (W)
filament lamp requiring external power supply	$P_{max}/1,06$
discharge lamp with cap GX53	$P_{max}/0,75$
non-clear lamp with colour rendering index ≥ 90 and $P \leq 0,5 * (0,88\sqrt{\Phi}+0,049\Phi)$	$P_{max}/0,85$
discharge lamp with colour rendering index ≥ 90 and $T_c \geq 5\ 000\ K$	$P_{max}/0,76$
non-clear lamp with second envelope and $P \leq 0,5 * (0,88\sqrt{\Phi}+0,049\Phi)$	$P_{max}/0,95$
LED lamp requiring external power supply	$P_{max}/1,1$

2. Lamp Functionality Requirements

The lamp functionality requirements are set out in Table 4 for compact fluorescent lamps and in Table 5 for lamps excluding compact fluorescent lamps and LED lamps.

Where the rated lamp lifetime is higher than 2 000 h, the Stage 1 requirements for the parameters 'Rated lamp lifetime', 'Lamp Survival Factor' and 'Lumen maintenance' in Tables 4 and 5 are only applicable as from Stage 2.

For the purposes of testing the number of times the lamp can be switched on and off before failure, the switching cycle shall consist of periods comprising 1 minute on and 3 minutes off, while the other test conditions are defined according to Annex C. For the purposes of testing lamp lifetime, lamp survival factor, lumen maintenance and premature failure, the standard switching cycle according to Annex C shall be used.

Table 4

Functionality requirements for compact fluorescent lamps

Functionality parameter	Stage 1
Lamp survival factor at 6 000 h	$\geq 0,70$
Lumen maintenance	At 2 000 h: $\geq 88 \%$ ($\geq 83 \%$ for lamps with second lamp envelope) At 6 000 h: $\geq 70 \%$
Number of switching cycles before failure	\geq lamp lifetime expressed in hours $\geq 30\,000$ if lamp starting time $> 0,3$ s
Starting time	$< 1,5$ s if $P < 10$ W $< 1,0$ s if $P \geq 10$ W
Lamp warm-up time to 60 % Φ	< 40 s or < 100 s for lamps containing mercury in amalgam form
Premature failure rate	$\leq 2,0 \%$ at 400 h
UVA + UVB radiation	$\leq 2,0$ mW/klm
UVC radiation	$\leq 0,01$ mW/klm
Lamp power factor	$\geq 0,50$ if $P < 25$ W $\geq 0,90$ if $P \geq 25$ W
Colour rendering (Ra)	≥ 80

Table 5

Functionality requirements for lamps excluding compact fluorescent lamps and LED lamps

Functionality parameter	Stage 1
Rated lamp lifetime	$\geq 2\ 000$ h
Lumen maintenance	$\geq 85\ %$ at $75\ %$ of rated average lifetime
Number of switching cycles	\geq four times the rated lamp life expressed in hours
Starting time	$< 0,2$ s
Lamp warm-up time to $60\ % \Phi$	$\leq 1,0$ s
Premature failure rate	$\leq 5,0\ %$ at 200 h
Lamp power factor	$\geq 0,95$

3. Product information requirements on lamps

For non-directional household lamps, the following information shall be provided, except where otherwise stipulated.

3.1 Information to be visibly displayed prior to purchase to end-users on the packaging and on free access websites

The information does not need to be specified using the exact wording of the list below. It may be displayed using graphs, figures or symbols rather than text.

These information requirements do not apply to filament lamps not fulfilling the efficacy requirements of Stage 1.

(a) When the nominal lamp power is displayed outside the energy label in accordance with rules on labelling of household lamps, the nominal luminous flux of the lamp shall also be separately displayed in a font at least twice as large as the nominal lamp power display outside the label;

(b) Nominal life time of the lamp in hours (not higher than the rated life time);

(c) Number of switching cycles before premature lamp failure;

(d) Colour temperature (also expressed as a value in Kelvins);

(e) Warm-up time up to $60\ %$ of the full light output (may be indicated as 'instant full light' if less than 1 second);

(f) A warning if the lamp cannot be dimmed or can be dimmed only on specific dimmers;

(g) If designed for optimal use in non-standard conditions (such as ambient temperature $T_a \neq 25$ °C), information on those conditions;

(h) Lamp dimensions in millimeters (length and diameter);

(i) If equivalence with an incandescent lamp is claimed on the packaging, the claimed equivalent incandescent lamp power (rounded to 1 W) shall be that corresponding in Table 6 to the luminous flux of the lamp contained in the packaging.

The intermediate values of both the luminous flux and the claimed incandescent lamp power (rounded to 1W) shall be calculated by linear interpolation between the two adjacent values.

Table 6

Rated lamp luminous flux Φ [lm]			Claimed equivalent incandescent lamp power
CFL	Halogen	LED and other lamps	[W]
125	119	136	15
229	217	249	25
432	410	470	40
741	702	806	60
970	920	1055	75
1398	1326	1521	100
2253	2137	2452	150
3172	3009	3452	200

(j) The term 'energy saving lamp' or any similar product related promotional statement about lamp efficacy may only be used if the lamp complies with the efficacy requirements applicable to non-clear lamps in Stage 1 according to Tables 1, 2 and 3.

If the lamp contains mercury

(k) Lamp mercury content as X,X mg;

(l) Indication which website to consult in case of accidental lamp breakage to find instructions on how to clean up the lamp debris.

3.2. Information to be made publicly available on free-access websites

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

(a) The information specified in point 3.1;

(b) Rated wattage (0,1 W precision);

(c) Rated luminous flux;

- (d) Rated lamp life time;
- (e) Lamp power factor;
- (f) Lumen maintenance factor at the end of the nominal life;
- (g) Starting time (as X,X seconds);
- (h) Colour rendering.

If the lamp contains mercury

- (i) Instructions on how to clean up the lamp debris in case of accidental lamp breakage;
- (j) Recommendations on how to dispose of the lamp at its end of life.

ANNEX C
VERIFICATION PROCEDURE FOR MARKET SURVEILLANCE PURPOSES

The Organization shall test a sample batch of minimum 20 lamps of the same model from the same manufacturer randomly selected.

The batch shall be considered to comply with the provisions set out in Annex B as applicable, of this Technical Regulation if the average results of the batch do not vary from the limit, threshold or declared values by more than 10 %.

Otherwise, the model shall be considered not to comply.

For the purposes of checking conformity with the requirements, the Organization shall use accurate and reliable state-of-the-art measurement methods which deliver reproducible results, including:

- where available, Jordanian standards adopting harmonised standards, the reference numbers of which have been published for that purpose in the Official gazette in accordance with Article 11 of the Framework Technical Regulation,
- otherwise, the methods set out in Jordanian standards adopting the following documents:

Measured parameter	Organisation (1)	Reference	Title
Lamp mercury content	European Commission	Decision 2002/747/EC (Annex)	Commission Decision 2002/747/EC of 9 September 2002 establishing revised ecological criteria for the award of the Community ecolabel to light bulbs and amending Decision 1999/568/EC
Luminous efficacy	Cenelec	EN 50285:1999	Energy efficiency of electric lamps for household use — Measurement methods
Lamp caps	Cenelec	EN 60061:1993 All amendments up to A40:2008	Lamp caps and holders together with gauges for the control of interchangeability

			and safety Part 1: Lamp caps
Lamp lifetime	Cenelec	EN 60064:1995 Amendments A2:2003 A3:2006 A4:2007 A11:2007	Tungsten filament lamps for domestic and similar general lighting purposes - Performance requirements
	Cenelec	EN 60357:2003 Amendment A1:2008	Tungsten halogen lamps (non-vehicle) — Performance specifications
	Cenelec	EN 60969:1993 Amendments A1:1993 A2:2000	Self-ballasted lamps for general lighting services — Performance requirements
Lamp start time/ warmup time	Cenelec	EN 60969:1993 Amendments A1:1993 A2:2000	Self-ballasted lamps for general lighting services — Performance requirements
Power factor	Cenelec	EN 61000-3-2:2006	Electromagnetic compatibility (EMC) Part 3-2: Limits — Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
Specific effective radiant UV power	Cenelec	EN 62471:2008	Photobiological safety of lamps and lamp systems
Colour rendering	International Commission on Illumination	CIE 13.3:1995	Method of Measuring and Specifying Colour Rendering Properties of Light Sources
Chromaticity	International	CIE 15:2004	Colorimetry

Correlated Colour Temperature (T _c [K])	Commission on Illumination		
Luminance	International Commission on Illumination	CIE 18.2:1983	The Basis of Physical Photometry
Luminous flux	International Commission on Illumination	CIE 84:1989	The Measurement of Luminous Flux
Lamp Lumen Maintenance Factor (LLMF) Lamp Survival Factor (LSF)	International Commission on Illumination	CIE 97:2005	Maintenance of indoor electric lighting systems
<p>(1) Cenelec: rue de Stassart/De Stassartstraat 35, B-1050 Brussels, tel. (32-2) 519 68 71, fax (32-2) 519 69 19 (http://www.cenelec.org).</p> <p>International Commission on Illumination: CIE Central Bureau Kegelgasse 27 A-1030 Vienna AUSTRIA tel: +43 1714 31 87 0 fax: +43 1714 31 87 18 (http://www.cie.co.at/).</p>			

ANNEX D
INDICATIVE BENCHMARKS FOR NON-DIRECTIONAL HOUSEHOLD LAMPS
(For information)

At the time of adoption of this Technical Regulation, the best available technology on the market for the products concerned was identified as follows:

1. Lamp Efficacy

The highest identified efficacy was 69 lm/W.

2. Lamp Functionality

Table 7

Functionality parameter	Compact fluorescent lamps
Rated lamp lifetime	20 000 h
Lumen maintenance	90 % at the rated lamp lifetime
Number of switching cycles	1 000 000
Starting time	< 0,1 s
Lamp warm - up time to 80 % Φ	15 s, or 4 s for special mixed CFL/halogen lamps
Lamp power factor	0,95

3. Lamp Mercury Content

The energy efficient compact fluorescent lamps with the lowest mercury content include not more than 1,23 mg mercury.