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COMMISSION REGULATION (EC) No 245/2009
of 18 March 2009
implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps, and repealing Directive 2000/55/EC of the European Parliament and of the Council
(Text with EEA relevance)

(OJ L 076, 24.3.2009, p.17)

Amended by:

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►M1	Commission Regulation (EU) No 347/2010 of 21 April 2010	L 104	20	24.4.2010

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(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,
Having regard to the Treaty establishing the European Community,
Having regard to Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council (1), and in particular Article 15(1) thereof,
After consulting the Ecodesign Consultation Forum,
Whereas:

(1) Under Directive 2005/32/EC ecodesign requirements shall be set by the Commission for energy using products representing significant volumes of sales and trades, having significant environmental impact and presenting significant potential for improvement in terms of their environmental impact without entailing excessive costs.

(2) Article 16(2) second indent of Directive 2005/32/EC provides that in accordance with the procedure referred to in Article 19(3) and the criteria set out in Article 15(2), and after consulting the Ecodesign Consultation Forum, the Commission shall as appropriate introduce an implementing measure on tertiary sector lighting products.

(3) The Commission has carried out two preparatory studies which analysed the technical,

environmental and economic aspects of lighting products typically used in the tertiary (office lighting and public street lighting) sector. The studies have been developed together with stakeholders and interested parties from the Community and third countries, and the results have been made publicly available on the EUROPA website of the European Commission.

(4) Mandatory ecodesign requirements apply to products placed on the market wherever they are installed, therefore such requirements cannot be made dependent on the application in which the product is used (such as office lighting or public street lighting). Therefore this Regulation should address specific products, such as fluorescent lamps without integrated ballast, high intensity discharge lamps, and ballasts and luminaires able to operate such lamps. Indicative benchmarks can be helpful in guiding users on the best available technology for specific applications (such as office or public street lighting).

(5) Products subject to this Regulation are meant to be used essentially for general lighting purposes, meaning that they contribute to the provision of artificial light replacing natural light for the purposes of normal human vision. Special purpose lamps (such as lamps used in computer screens, photocopiers, tanning appliances, terrarium lighting and other similar applications) should not be subject to this Regulation.

(6) The environmental aspects of the EuPs covered that are identified as significant for the purposes of this Regulation are:
(a) energy in the use phase;
(b) mercury content of lamps.

(7) The annual electricity consumption related to products subject to this Regulation in the Community has been estimated to be 200 TWh in 2005, corresponding to 80 Mt CO2 emissions. Without taking specific measures, the consumption is predicted to increase to 260 TWh in 2020. The preparatory studies showed that electricity consumption of products subject to this Regulation can be significantly reduced.

(8) Mercury content of the installed base of lamps has been estimated to be 12,6 tons in 2005. Without taking specific measures, the mercury content of the installed lamp base is predicted to increase to 18,6 tons in 2020 while it has been demonstrated that it can be significantly reduced.

(9) In the absence of internationally agreed scientific methods for measuring its environmental impact, the significance of the so-called 'light pollution' could not be assessed. However it is accepted that measures developed for increasing the lighting efficacy of tertiary lighting equipment can have a positive impact on 'light pollution'.

(10) Improvements of electricity consumption of products subject to this Regulation should be achieved by applying existing non-proprietary cost effective technologies, which lead to a reduction of the combined expenses for purchasing and operating equipment.

(11) Ecodesign requirements for products subject to this Regulation should be set with a view to improving the environmental performance of the products affected, contributing to the functioning of the internal market and to the Community objective of reducing energy consumption by 20 % in 2020.

(12) This Regulation should increase the market penetration of technologies yielding improved energy efficiency for products subject to this Regulation, leading to estimated energy savings of

38 TWh in 2020, compared to a business as usual scenario.

(13) The setting of energy efficiency requirements for lamps subject to this Regulation will lead to a decrease of their overall mercury content.

(14) The ecodesign requirements should not have negative impact on the functionality of the product and should not negatively affect health, safety or the environment. In particular, the benefits of reducing the electricity consumption during the use phase should over-compensate potential, if any, additional environmental impacts during the production phase of products subject to this Regulation.

(15) A staged entry into force of the ecodesign requirements should provide a sufficient timeframe for manufacturers to redesign products subject to this Regulation as appropriate. The timing of the stages should be set in such a way that negative impacts related to functionalities of equipment on the market are avoided, and cost impacts for end-users and manufacturers, in particular small and medium enterprises, are taken into account, while ensuring timely achievement of the objectives of this Regulation. The revision according to Article 8 should, inter alia, verify whether the performance requirement of ballasts for HID lamps in Annex III Section 2.1.C will be achievable eight years after this Regulation has entered into force.

(16) The removal of replacement lamps from the market should be planned taking into account impacts on the end-users. Member States could impose higher requirements on lighting installations.

(17) Measurements of the relevant product parameters should be performed taking into account the generally recognised state of the art measurement methods; manufacturers may apply harmonised standards set up in accordance with Article 10 of Directive 2005/32/EC.

(18) In conformity with Article 8 of Directive 2005/32/EC, this Regulation should specify that the applicable conformity assessment procedures are the internal design control set out in Annex IV to Directive 2005/32/EC and the management system for assessing conformity set out in Annex V to Directive 2005/32/EC.

(19) In order to facilitate compliance checks manufacturers should provide information in the technical documentation referred to in Annexes V and VI to Directive 2005/32/EC in so far as this information relates to the requirements laid down in this Regulation.

(20) In addition to the legally binding requirements, the identification of indicative benchmarks for best available technologies for products subject to this Regulation should contribute to ensuring wide availability and easy access to information. This is particularly useful for small and medium enterprises and very small firms, as it further facilitates the integration of best design technologies for improving the life cycle environmental performance of products subject to this Regulation.

(21) Although the mercury content of fluorescent and high intensity discharge lamps is considered to be a significant environmental aspect, it is appropriate to regulate it under Directive 2002/95/EC of the European Parliament and of the Council (2), which covers also the lamp types exempted from this Regulation.

(22) Directive 2000/55/EC of the European Parliament and of the Council of 18 September 2000 on

energy efficiency requirements for ballasts for fluorescent lighting (3) is an implementing measure of Directive 2005/32/EC and has an ongoing effect on the installed ballast base, due to long luminaire and magnetic ballast lifetimes. However, there is further improvement potential, and more demanding minimum energy efficiency requirements as compared to Directive 2000/55/EC would be appropriate. Directive 2000/55/EC should therefore be replaced by this Regulation.

(23) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2005/32/EC,

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter and scope

This Regulation establishes ecodesign requirements for the placing on the market of fluorescent lamps without integrated ballast, of high intensity discharge lamps, and of ballasts and luminaires able to operate such lamps as defined in Article 2, even when they are integrated into other energy-using products.

This Regulation also provides indicative benchmarks for products intended for use in office lighting and public street lighting.

The products listed in Annex I shall be exempt from the requirements set out in this Regulation.

Article 2

Definitions

For the purposes of this Regulation, the definitions set out in Directive 2005/32/EC shall apply. The following definitions shall also apply:

1. 'general lighting' means substantially uniform lighting of an area without provision for special local requirements;
2. 'office lighting' means a fixed lighting installation for office work intended to enable people to perform visual tasks efficiently and accurately;
3. 'public street lighting' means a fixed lighting installation intended to provide good visibility to users of outdoor public traffic areas during the hours of darkness to support traffic safety, traffic flow and public security;
4. 'discharge lamp' means 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;
5. 'ballast' means a device which serves mainly 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. A ballast 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);
6. 'luminaire' means an apparatus which distributes, filters or transforms the light transmitted from one or more light sources and which includes all the parts necessary for supporting, fixing and protecting the light sources and, where necessary, circuit auxiliaries together with the means for connecting them to the supply, but not the light sources themselves;
7. 'fluorescent lamps' means discharge lamps 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;
8. 'fluorescent lamps without integrated ballast' means single and double capped fluorescent lamps without integrated ballast;

9. ‘high intensity discharge lamps’ means electric discharge lamps in which the light producing arc is stabilised by wall temperature and the arc has a bulb wall loading in excess of 3 watts per square centimetre.

For the purposes of Annexes I and III to VII, the definitions set out in Annex II shall also apply.

Article 3

Ecodesign requirements

The ecodesign requirements related to fluorescent lamps without integrated ballast, to high intensity discharge lamps and to ballasts and luminaires able to operate such lamps are set out in Annex III.

Article 4

Conformity assessment

The procedure for assessing conformity referred to in Article 8 of Directive 2005/32/EC shall be the internal design control system set out in Annex IV to Directive 2005/32/EC or the management system set out in Annex V to Directive 2005/32/EC.

For the purposes of conformity assessment pursuant to Article 8 of Directive 2005/32/EC, the technical documentation file shall contain a copy of the product information provided in accordance with Annex III parts 1.3, 2.2, and 3.2.

Article 5

Verification procedure for market surveillance purposes

Surveillance checks shall be carried out in accordance with the verification procedure set out in Annex IV.

Article 6

Indicative benchmarks

The indicative benchmarks for best-performing products and technology currently available on the market are identified:

(a) in Annex V for fluorescent lamps without integrated ballast, for high intensity discharge lamps and for ballasts and luminaires able to operate such lamps;

(b) in Annexes VI and VII for products intended for use in office lighting or in public street lighting.

Article 7

Repeal

Directive 2000/55/EC shall be repealed as from one year after the entry into force of this Regulation.

Article 8

Revision

No later than 5 years after the entry into force of this Regulation, the Commission shall review it in light of technological progress.

Article 9

Entry into force

This Regulation shall enter into force on the 20th day following its publication in the Official Journal of the European Union.

The requirements set out in Annex III shall apply in accordance with the timetable provided for therein.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

ANNEX I

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Exemptions

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1. ►M1 The following lamps shall be exempt from the provisions of Annex III, provided that the technical documentation file drawn up for the purposes of conformity assessment pursuant to Article

8 of Directive 2009/125/EC states which of the technical parameters listed hereunder provide(s) a basis for their exemption: ◄
(a) lamps that are not white light sources as defined in Annex II; this exemption does not apply to high pressure sodium lamps;
(b) lamps that are directional light sources as defined in Annex II;
▼M1
(c) blended high intensity discharge lamps having:
— 6 % or more of total radiation of the range 250-780 nm in the range of 250-400 nm; and
— 11 % or more of total radiation of the range 250-780 nm in the range of 630-780 nm; and
— 5 % or more of total radiation of the range 250-780 nm in the range of 640-700 nm;
(d) blended high intensity discharge lamps having:
— the peak of the radiation between 315-400 nm (UVA) or 280-315 nm (UVB);
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(e) double capped fluorescent lamps having:
— a diameter of 7 mm (T2) and less,
— a diameter of 16 mm (T5) and lamp power P ≤ 13 W or P > 80 W,
— a diameter of 38 mm (T12), lamp cap G-13 Medium BiPin base, +/– 5 m (+magenta, –green) colour compensating filter value limit (cc). CIE coordinates x=0,330 y=0,335 and x=0,415 y=0,377, and
— a diameter of 38 mm (T12) and equipped with an external ignition strip;
(f) single capped fluorescent lamps having a diameter of 16 mm (T5) 2G11 4 pin base, Tc = 3 200 K with chromaticity coordinates x=0,415 y=0,377 and Tc = 5 500 K with chromaticity coordinates x=0,330 y=0,335;
(g) high intensity discharge lamps with Tc > 7 000 K;
(h) high intensity discharge lamps having a specific effective UV output > 2 mW/klm; and
(i) high intensity discharge lamps not having lamp cap E27, E40, PGZ12.
▼M1
2. The following products shall be exempt from the provisions of Annex III, provided that in all forms of product information it is stated that they are not intended for general lighting use within the meaning of this Regulation, or that they are intended for use in applications listed in points (b) to (e):
(a) products intended for use in applications other than general lighting and products incorporated into products which do not provide a general lighting function;
(b) lamps covered by the requirements of Directives 94/9/EC of the European Parliament and of the Council (4) or Directive 1999/92/EC of the European Parliament and of the Council (5);
(c) emergency lighting luminaires and emergency sign luminaires within the meaning of Directive 2006/95/EC of the European Parliament and of the Council (6).
(d) ballasts intended for use in luminaires defined in paragraph (c) and designed to operate lamps in emergency conditions;
(e) luminaires covered by the requirements of Directive 94/9/EC, Directive 1999/92/EC, Directive 2006/42/EC of the European Parliament and of the Council (7), Council Directive 93/42/EEC (8), Council Directive 88/378/EEC (9) and luminaires integrated into equipment covered by these requirements.
The intended purpose shall be stated for each product in the product information, and the technical documentation file drawn up for the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC shall list the technical parameters that make the product design specific for the stated intended purpose.
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ANNEX II

Technical parameters covered and definitions for the purposes of Annexes I and III to VII

1. Technical parameters for ecodesign requirements

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(a) 'Luminous efficacy of a source', 'light source efficacy' or 'lamp efficacy' (ηsource), which means the quotient of the luminous flux emitted (Φ) by the power consumed by the source (Psource). ηsource = Φ / Psource. Unit: lm/W. The power dissipated by auxiliary equipment such as ballasts is not included in the power consumed by the source.

(b) 'Lamp Lumen Maintenance Factor' (LLMF), which means the ratio of the luminous flux emitted by the lamp at a given time in its life to the initial luminous flux.

(c) 'Lamp Survival Factor' (LSF), which means the fraction of the total number of lamps which continue to operate at a given time under defined conditions and switching frequency.

For the purposes of Table 6 in Annex III, the LSF shall be measured in high frequency operating mode with a switching cycle of 11h/1h.

(d) 'Ballast efficiency' (ηballast), which means the ratio between the lamp power (ballast output) and the input power of the lamp-ballast circuit with possible sensors, network connections and other auxiliary loads disconnected.

(e) 'Chromaticity', which means 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', which means a quantity derived from radiant flux (radiant power) by evaluating the radiation according to the spectral sensitivity of the human eye.

(g) 'Correlated Colour Temperature' (Tc [K]), which means 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' (Ra), which 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.

(i) 'Specific effective radiant UV power', which means the effective power of the UV radiation of a lamp related to its luminous flux (unit: mW/klm).

(j) 'Ingress protection grading', which means a coding system to indicate the degree of protection provided by an enclosure against ingress of dust, solid objects and moisture and to give additional information in connection with such protection.

2. Technical parameters for indicative benchmarks

(a) 'Lamp mercury content', which means the amount of mercury contained in the lamp.

(b) 'Luminaire Maintenance Factor' (LMF), which means the ratio of the light output ratio of a luminaire at a given time to the initial light output ratio.

(c) 'Utilisation Factor' (UF) of an installation for a reference surface, which means the ratio of the luminous flux received by the reference surface to the sum of the individual total fluxes of the lamps of the installation.

3. Definitions

(a) 'Directional Light Source' (DLS) means light sources having at least 80 % light output within a solid angle of π sr (corresponding to a cone with angle of 120 °).

(b) 'White light source' means a light source having chromaticity coordinates that satisfy the following requirement:

— $0{,}270 < x < 0{,}530$

— $-2{,}3172\,x^2 + 2{,}3653\,x - 0{,}2199 < y < -2{,}3172\,x^2 + 2{,}3653\,x - 0{,}1595$

(c) A 'rated' value means a quantity value for a characteristic of a product for operating conditions specified in this Regulation or in applicable standards. Unless stated otherwise, all product parameter limits are expressed in rated values.

(d) A 'nominal' value means an approximate quantity value used to designate or identify a product.

(e) ‘Light pollution’ means the sum of all adverse impacts of artificial light on the environment, including the impact of obtrusive light.
(f) ‘Obtrusive light’ means the part of the light from a lighting installation that does not serve the purpose for which the installation was designed. It includes:
— light improperly falling outside the area to be lit,
— diffused light in the neighbourhood of the lighting installation,
— sky glow, which is the brightening of the night sky that results from the direct and indirect reflection of radiation (visible and non-visible), scattered from the constituents of the atmosphere (gas molecules, aerosols and particulate matter) in the direction of observation.
(g) ‘Efficiency Base ballast’ (EBb) means the relationship between the rated lamp power (Plamp) and the ballast efficiency.
For ballasts for single and double capped fluorescent lamps, the EBbFL is calculated as follows:
When Plamp ≤ 5 W : EBbFL = 0,71
When 5 W < Plamp < 100 W : EBbFL = Plamp/(2*sqrt(Plamp/36)+38/36*Plamp +1)
When Plamp ≥ 100 W : EBbFL = 0,91
(h) ‘Second lamp envelope’ means 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. In determining the presence of a second lamp envelope, the arc tubes of high intensity discharge lamps shall not count as a lamp envelope.
(i) ‘Light source control gear’ means one or more components between the supply and one or more light sources which may serve to transform the supply voltage, limit the current of the lamp(s) to the required value, provide starting voltage and preheating current, prevent cold starting, correct power factor or reduce radio interference. Ballasts, halogen convertors and transformers and Light Emitting Diode (LED) drivers are examples of light source control gears.
(j) ‘High-pressure mercury (vapour) lamp’ means a high intensity discharge lamp in which the major portion of light is produced, directly or indirectly, by radiation from mercury operating at a partial pressure in excess of 100 kilopascals.
(k) ‘High-pressure sodium (vapour) lamp’ means a high intensity discharge lamp in which the light is produced mainly by radiation from sodium vapour operating at a partial pressure of the order of 10 kilopascals.
(l) ‘Metal halide lamp’ means a high intensity discharge lamp 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.
(m) ‘Electronic or high frequency ballast’ means a mains supplied a.c. to a.c. invertor, including stabilising elements for starting and operating one or more tubular fluorescent lamps, generally at high frequency.
(n) ‘Clear lamp’ means a high-intensity discharge lamp with a transparent outer envelope or outer tube in which the light producing arc tube is clearly visible (e.g. clear glass lamp).
▼M1
(o) ‘Blended lamp’ means a lamp containing a mercury vapour lamp and an incandescent lamp filament connected in series in the same bulb.
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ANNEX III
Ecodesign requirements for fluorescent and high intensity discharge lamps and ballasts and luminaires able to operate such lamps

For each ecodesign requirement, the moment from which it applies is specified below. Unless a requirement is superseded or this is otherwise specified, it shall continue to apply together with the requirements introduced at later stages.

1. REQUIREMENTS FOR FLUORESCENT LAMPS WITHOUT INTEGRATED BALLAST AND FOR HIGH INTENSITY DISCHARGE LAMPS

1.1. Lamp efficacy requirements

A. First stage requirements

One year after the entry into force of this Regulation:

Double capped fluorescent lamps of 16 mm and 26 mm diameter (T5 and T8 lamps) shall have at least the rated luminous efficacies as specified in Table 1 at 25 °C.

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Spiral-shaped double capped fluorescent lamps of all diameters equal to or larger than 16 mm (T5) shall comply with the requirements set out in Table 5 for T9 circular lamps.

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Table 1

Rated minimum efficacy values for T8 and T5 lamps

T8 (26 mm Ø)		T5 (16 mm Ø) High Efficiency		T5 (16 mm Ø) High Output	
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value
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				

Single capped fluorescent lamps shall have the following rated luminous efficacies at 25 °C.

In case the nominal wattages or lamp shapes are different from those listed in tables 2 to 5: lamps must reach the luminous efficacy of the nearest equivalent in terms of wattage and shape. If the nominal wattage is at equal distance from two wattages in the table, it shall conform to the higher efficacy of the two. If the nominal wattage is higher than the highest wattage in the table, it shall conform to the efficacy of that highest wattage.

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Table 2

Rated minimum efficacy values for single capped fluorescent lamps working on electromagnetic and electronic ballast

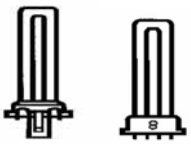
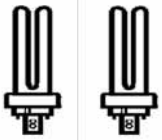
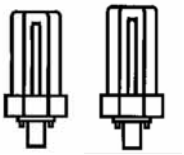
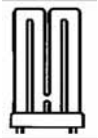
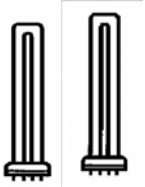
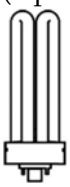
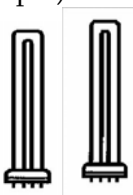
Small single parallel tube, lamp cap G23 (2 pin) or 2G7 (4 pin) 		Double parallel tubes, lamp cap G24d (2 pin) or G24q (4 pin) 		Triple parallel tubes, lamp cap GX24d (2 pin) or GX24q (4 pin) 	
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value
5	48	10	60	13	62
7	57	13	69	18	67
9	67	18	67	26	66
11	76	26	66		
4 legs in one plane, lamp cap 2G10 (4 pin) 		Long single parallel tube, lamp cap 2G11 (4 pin) 			
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value		
18	61	18	67		
24	71	24	75		
36	78	34	82		
		36	81		

Table 3
Rated minimum efficacy values for single capped fluorescent lamps, working only on electronic ballast

Triple parallel tubes, lamp cap	Four parallel tubes, lamp cap	Long single parallel tube, lamp

GX24q (4 pin) 		GX24q (4 pin) 		cap 2G11 (4 pin) 	
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value
32	75	57	75	40	83
42	74	70	74	55	82
57	75			80	75
70	74				

▼B

Table 4
Rated minimum efficacy values for single capped fluorescent lamps with square shape or (very) high output

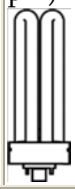
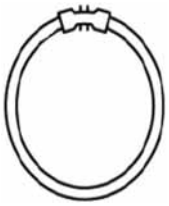
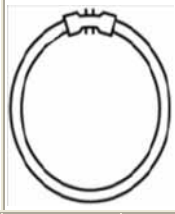
Single flat plane tube, lamp cap GR8 (2 pin), GR10q (4 pin) or GRY10q3 (4 pin) 		Four or three parallel T5 tubes, lamp cap 2G8 (4 pin) 	
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value
10	65	60	67
16	66	82	75
21	64	85	71
28	73	120	75
38	71		
55	71		

Table 5

Rated minimum efficacy values for T9 and T5 Circular lamps

T9 Circular, tube diameter 29 mm with base G10q 		T5 Circular, tube diameter 16 mm with base 2GX13 	
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value
22	52	22	77
32	64	40	78
40	70	55	75
60	60	60	80

The required luminous efficacy at 25 °C may be lower than required in the tables above in the following cases:

▼M1

Table 6

Deduction percentages for rated minimum efficacy values for fluorescent lamps with high colour temperature and/or high colour rendering and/or second lamp envelope and/or long life

Lamp parameter	Deduction from luminous efficacy at 25 °C
Tc ≥ 5 000 K	–10 %
95 ≥ Ra > 90	–20 %
Ra > 95	–30 %
Second lamp envelope	–10 %
Lamp Survival Factor ≥ 0,50 after 40 000 burning hours	–5 %

▼B

The indicated deductions are cumulative.

Single and double capped fluorescent lamps that do not have their optimum temperature at 25 °C must still comply at their optimum temperature with the luminous efficacy requirements as set out in the tables above.

B. Second stage requirements

Three years after the entry into force of this Regulation, the following efficacy requirements shall apply to fluorescent lamps without integrated ballast and high-intensity discharge lamps.

The requirements applicable to double capped fluorescent lamps 26 mm in diameter (T8) during the first stage shall apply to all double capped fluorescent lamps of other diameters than those covered in the first stage.

These lamps must conform to the minimum efficacy of the T8 lamp which is their nearest equivalent with regards to wattage. If the nominal wattage is higher than the highest wattage in the table, it shall conform to the efficacy of that highest wattage.

▼M1

The corrections (Table 6) and the specific requirements for spiral-shaped double capped fluorescent lamps defined for the first stage shall continue to apply.

▼B

Lamps with Tc ≥ 5 000 K or equipped with a second lamp envelope shall fulfil at least 90 % of the applicable lamp efficacy requirements in tables 7, 8 and 9.

High Pressure Sodium lamps with Ra ≤ 60 shall have at least the rated luminous efficacies in Table 7:

▼M1

Table 7

Rated minimum efficacy values for high pressure sodium lamps with Ra ≤ 60

Nominal Lamp wattage [W]	Rated Lamp Efficacy [lm/W] — Clear lamps	Rated Lamp Efficacy [lm/W] — Not clear lamps
W ≤ 45	≥ 60	≥ 60
45 < W ≤ 55	≥ 80	≥ 70
55 < W ≤ 75	≥ 90	≥ 80
75 < W ≤ 105	≥ 100	≥ 95
105 < W ≤ 155	≥ 110	≥ 105
155 < W ≤ 255	≥ 125	≥ 115
255 < W ≤ 605	≥ 135	≥ 130

The requirements in Table 7 shall apply to high pressure sodium retrofit lamps designed to operate on high pressure mercury vapour lamp control gear only 6 years after the entry into force of this Regulation.

Metal halide lamps with Ra ≤ 80 and high pressure sodium lamps with Ra > 60 shall have at least the rated luminous efficacies in Table 8:

Table 8

Rated minimum efficacy values for Metal Halide Lamps with Ra ≤ 80 and for high pressure sodium lamps with Ra > 60

Nominal Lamp Wattage [W]	Rated Lamp Efficacy [lm/W] — Clear lamps	Rated Lamp Efficacy [lm/W] — Not clear lamps
W ≤ 55	≥ 60	≥ 60
55 < W ≤ 75	≥ 75	≥ 70
75 < W ≤ 105	≥ 80	≥ 75
105 < W ≤ 155	≥ 80	≥ 75
155 < W ≤ 255	≥ 80	≥ 75
255 < W ≤ 405	≥ 85	≥ 75

Six years after the entry into force of this Regulation, other high intensity discharge lamps shall have at least the rated luminous efficacies in Table 9:

Table 9

Rated minimum efficacy values for other high intensity discharge lamps

Nominal Lamp wattage [W]	Rated Lamp Efficacy [lm/W]
W ≤ 40	50
40 < W ≤ 50	55
50 < W ≤ 70	65
70 < W ≤ 125	70
125 < W	75

C. Third stage requirements

Eight years after the entry into force of this Regulation:

▼M1

Fluorescent lamps without integrated ballast shall be able to operate with ballasts of energy efficiency class A2 or more efficient ballasts in accordance with point 2.2 of Annex III. In addition they may also operate with ballasts of less efficient classes than A2.

▼B

Metal halide lamps shall have at least the rated luminous efficacies in Table 10:

Table 10

Rated minimum efficacy values for metal halide lamps (third stage)

Nominal Lamp wattage (W)	Rated Lamp Efficacy (lm/W) — Clear lamps	Rated Lamp Efficacy (lm/W) — Not clear lamps
W ≤ 55	≥ 70	≥ 65
55 < W ≤ 75	≥ 80	≥ 75
75 < W ≤ 105	≥ 85	≥ 80
105 < W ≤ 155	≥ 85	≥ 80
155 < W ≤ 255	≥ 85	≥ 80
255 < W ≤ 405	≥ 90	≥ 85

Lamps equipped with Tc ≥ 5 000 K or with a second lamp envelope shall fulfil at least 90 % of the applicable lamp efficacy requirements.

1.2. Lamp performance requirements

A. First stage requirements

One year after the entry into force of this Regulation:

Fluorescent lamps without integrated ballast covered by the requirements of Annex III.1.1.A shall have a colour rendering index (Ra) of at least 80.

B. Second stage requirements

Three years after the entry into force of this Regulation:

Fluorescent lamps without integrated ballast shall have a colour rendering index (Ra) of at least 80. They shall have at least the lamp lumen maintenance factors in Table 11:

▼M1

Table 11

Lamp lumen maintenance factors for single and double capped fluorescent lamps — Stage 2

Lamp lumen maintenance factor	Burning hours			
Lamp types	2 000	4 000	8 000	16 000
Double-Capped Fluorescent lamps operating on non-high frequency ballasts	0,95	0,92	0,90	—
T8 Double-Capped Fluorescent lamps on high frequency ballast with warmstart	0,96	0,92	0,91	0,90
Other Double-Capped Fluorescent lamps on	0,95	0,92	0,90	0,90

high frequency ballast with warmstart				
Circular Single-Capped Fluorescent lamps operating on non-high frequency ballasts, T8 U-shaped double-capped fluorescent lamps and spiral-shaped double capped fluorescent lamps of all diameters equal to or larger than 16 mm (T5)	0,80	0,74	—	—
	0,72 at 5 000 burning hours			
Circular Single-Capped Fluorescent lamps operating on high frequency ballasts	0,85	0,83	0,80	—
	0,75 at 12 000 burning hours			
Other Single-Capped Fluorescent lamps operating on non-high frequency ballasts	0,85	0,78	0,75	—
Other Single-Capped Fluorescent lamps on high frequency ballast with warmstart	0,90	0,84	0,81	0,78

▼M1

The following cumulative deductions shall be applied to the values in Table 11:

Table 11a

Deduction percentages for fluorescent lamp lumen maintenance requirements

Lamp parameter	Deduction from lamp lumen maintenance requirement
Lamps with 95 ≥ Ra > 90	At burning hours ≤ 8 000 h: – 5 % At burning hours > 8 000 h: – 10 %
Lamps with Ra > 95	At burning hours ≤ 4 000 h: – 10 % At burning hours > 4 000 h: – 15 %
Lamps with a colour temperature ≥ 5 000 K	–10 %

▼B

Fluorescent lamps without integrated ballast shall have at least the lamp survival factors in Table 12:
▼M1

Table 12
Lamp survival factors for single and double capped fluorescent lamps — Stage 2

Lamp survival factor	Burning hours			
Lamp types	2 000	4 000	8 000	16 000
Double-Capped Fluorescent lamps operating on non-high frequency ballasts	0,99	0,97	0,90	—
Double-Capped Fluorescent lamps on high frequency ballast with warmstart	0,99	0,97	0,92	0,90
Circular Single-Capped Fluorescent lamps operating on non-high frequency ballasts, T8 U-shaped double-capped fluorescent lamps and spiral-shaped double capped fluorescent lamps of all diameters equal to or larger than 16 mm (T5)	0,98	0,77	—	—
	0,50 at 5 000 burning hours			
Circular Single-Capped Fluorescent lamps operating on high frequency ballasts	0,99	0,97	0,85	—
	0,50 at 12 000 burning hours			
Other Single-Capped Fluorescent lamps operating on non-high frequency ballasts	0,98	0,90	0,50	—
Other Single-Capped Fluorescent lamps on high frequency ballast with warmstart	0,99	0,98	0,88	—

▼B
High pressure sodium lamps shall have at least the lamp lumen maintenance factors and lamp survival factors in Table 13:
▼M1

Table 13
Lamp lumen maintenance factors and lamp survival factors for high pressure sodium lamps — Stage 2

High pressure sodium lamp category and burning hours for measurement		Lamp lumen maintenance factor	Lamp survival factor
P ≤ 75 W LLMF and LSF measured at 12 000 burning hours	Ra ≤ 60	> 0,80	> 0,90
	Ra > 60	> 0,75	> 0,75
	all retrofit lamps designed to operate on high pressure mercury vapour lamp ballast	> 0,75	> 0,80
P > 75 W LLMF and LSF measured at 16 000 burning hours	Ra ≤ 60	> 0,85	> 0,90
	Ra > 60	> 0,70	> 0,65
	all retrofit lamps designed to operate on high pressure mercury vapour lamp ballast	> 0,75	> 0,55

The requirements in Table 13 for retrofit lamps designed to operate on high pressure mercury vapour lamp ballast shall be applicable until 6 years after the entry into force of this Regulation.

▼B

C. Third stage requirements

Eight years after the entry into force of this Regulation:

Metal halide lamps shall have at least the lamp lumen maintenance factors and lamp survival factors in Table 14:

Table 14

Lamp lumen maintenance factors and lamp survival factors for metal halide lamps — Stage 3

Burning hours	Lamp lumen maintenance factor	Lamp survival factor
12 000	> 0,80	> 0,80

1.3. Product information requirements on lamps

One year after the entry into force of this Regulation, manufacturers shall provide at least the following information on free-access websites and in other forms they deem appropriate for each of their fluorescent lamps without integrated ballast and each of their high intensity discharge lamps. That information shall also be contained in the technical documentation file drawn up for the purposes of conformity assessment pursuant to Article 8 of Directive 2005/32/EC.

(a) Nominal and rated lamp wattage.

(b) Nominal and rated lamp luminous flux.

(c) Rated lamp efficacy at 100 h in standard conditions (25 °C, for T5 lamps at 35 °C). For fluorescent lamps both at 50 Hz (mains frequency) operation (where applicable) and at High Frequency (> 50 Hz) operation (where applicable) for the same rated luminous flux in all cases, indicating for High Frequency operation the calibration current of the test conditions and/or the rated voltage of the HF generator with the resistance. It shall be stated in a conspicuous manner that the power dissipated by auxiliary equipment such as ballasts is not included in the power consumed by the source.
(d) Rated lamp Lumen Maintenance Factor at 2 000 h, 4 000 h, 6 000 h, 8 000 h, 12 000 h, 16 000 h and 20 000 h (up to 8 000 h only for new lamps on the market where no data is yet available), indicating which operation mode of the lamp was used for the test if both 50 Hz and High Frequency operation are possible.
(e) Rated lamp Survival Factor at 2 000 h, 4 000 h, 6 000 h, 8 000 h, 12 000 h, 16 000 h and 20 000 h (up to 8 000 h only for new lamps on the market where no data is yet available), indicating which operation mode of the lamp was used for the test if both 50 Hz and High Frequency operation are possible.
(f) lamp mercury content as X.X mg.
(g) Colour Rendering Index (Ra) of the lamp.
(h) Colour temperature of the lamp.
▼M1
(i) Ambient temperature inside the luminaire at which the lamp was designed to maximise its luminous flux. If this temperature is equal to or lower than 0 °C or equal to or higher than 50 °C, it shall be stated that the lamp is not suitable for indoor use at standard room temperatures.
▼M1
(j) For fluorescent lamps without integrated ballast, the energy efficiency index(es) of ballasts as defined in Table 17 with which the lamp can operate.
▼B
2. REQUIREMENTS ON BALLASTS FOR FLUORESCENT LAMPS WITHOUT INTEGRATED BALLAST AND BALLASTS FOR HIGH INTENSITY DISCHARGE LAMPS
2.1. Ballast energy performance requirements
Multiwattage ballasts shall comply with the requirements below according to each wattage on which they operate.
A. First stage requirements
One year after this Regulation comes into force:
The minimum energy efficiency index class shall be B2 for ballasts covered by table 17 in Annex III.2.2, A3 for the ballasts covered by table 18, and A1 for dimmable ballasts covered by table 19.
At the dimming position corresponding to 25 % of the lumen output of the operated lamp, the input power (Pin) of the lamp-ballast circuit shall not exceed:
$Pin < 50\ \% * PLrated/\eta ballast$
Where PLrated is the rated lamp power and ηballast is the minimum energy efficiency limit of the respective EEI class.
The power consumption of the fluorescent lamp ballasts shall not exceed 1,0 W when operated lamps do not emit any light in normal operating conditions and when other possible connected components (network connections, sensors etc.) are disconnected. If they cannot be disconnected, their power shall be measured and deducted from the result.
B. Second stage requirements
Three years after the implementing measure comes into force:
Ballasts for high intensity discharge lamps shall have the efficiency described in Table 15.

Table 15
Minimum efficiency for ballasts for high intensity discharge lamps — Stage 2

Nominal lamp wattage (P) W	Minimum ballast efficiency (ηballast) %
P ≤ 30	65
30 < P ≤ 75	75
75 < P ≤ 105	80
105 < P ≤ 405	85
P > 405	90

The power consumption of ballasts used with fluorescent lamps without integrated ballast shall not exceed 0,5 W when operated lamps do not emit any light in normal operating conditions. This requirement shall apply to ballasts when other possible connected components (network connections, sensors etc.) are disconnected. If they cannot be disconnected, their power shall be measured and deducted from the result.

C. Third stage requirements

Eight years after this Regulation comes into force:

Ballasts for fluorescent lamps without integrated ballast shall have the efficiency:

ηballast ≥ EBbFL

where EBbFL is defined in Annex II.3.g

Ballasts for high intensity discharge lamps shall have the efficiency described in Table 16.

Table 16

Minimum efficiency for ballasts for high intensity discharge lamps — Stage 3

Nominal lamp wattage (P) W	Minimum ballast efficiency (ηballast) %
P ≤ 30	78
30 < P ≤ 75	85
75 < P ≤ 105	87
105 < P ≤ 405	90
P > 405	92

2.2. Product information requirements on ballasts

Manufacturers of ballasts shall provide at least the following information on free-access websites and in other forms they deem appropriate for each of their ballast models. That information shall also be affixed in a distinct and durable form to the ballast. It shall also be contained in the technical

documentation file drawn up for the purposes of conformity assessment pursuant to Article 8 of Directive 2005/32/EC.

A. First stage requirements

One year after the entry into force of this Regulation:

for ballasts for fluorescents lamps, an energy efficiency index (EEI) class shall be provided as defined below.

'Energy efficiency index' (EEI) means a classification system of ballasts for fluorescent lamps without integrated ballasts in classes according to efficiency limit values. The classes for non-dimmable ballasts are (in descending order of efficiency) A2 BAT, A2, A3, B1, B2 and for dimmable ballasts A1 BAT and A1.

Table 17 contains the EEI classes for ballasts which are designed to operate the lamps mentioned in the table or other lamps which are designed to be operated by the same ballasts as the lamps mentioned in the table (meaning that the data of the reference ballast is equal).

▼M1

Table 17

Energy efficiency index requirements for non-dimmable ballasts for fluorescent lamps

LAMP DATA					BALLAST EFFICIENCY (Plamp/Pinput)				
					Non-dimmable				
Lamp type	Nominal Wattage	ILCOS CODE	Rated/typical wattage		A2 BAT	A2	A3	B1	B2
			50 Hz	HF					
	W		W	W					
T8	15	FD-15-E-G13-26/450	15	13,5	87,8 %	84,4 %	75,0 %	67,9 %	62,0 %
T8	18	FD-18-E-G13-26/600	18	16	87,7 %	84,2 %	76,2 %	71,3 %	65,8 %
T8	30	FD-30-E-G13-26/900	30	24	82,1 %	77,4 %	72,7 %	79,2 %	75,0 %
T8	36	FD-36-E-G13-26/1200	36	32	91,4 %	88,9 %	84,2 %	83,4 %	79,5 %
T8	38	FD-38-E-G13-26/1050	38,5	32	87,7 %	84,2 %	80,0 %	84,1 %	80,4 %
T8	58	FD-58-E-G13-26/1500	58	50	93,0 %	90,9 %	84,7 %	86,1 %	82,2 %
T8	70	FD-70-E-G13-26/1800	69,5	60	90,9 %	88,2 %	83,3 %	86,3 %	83,1 %
TC-L	18	FSD-18-E-2G11	18	16	87,7 %	84,2 %	76,2 %	71,3 %	65,8 %

TC-L	24	FSD-24-E-2G11	24	22	90,7 %	88,0 %	81,5 %	76,0 %	71,3 %
TC-L	36	FSD-36-E-2G11	36	32	91,4 %	88,9 %	84,2 %	83,4 %	79,5 %
TCF	18	FSS-18-E-2G10	18	16	87,7 %	84,2 %	76,2 %	71,3 %	65,8 %
TCF	24	FSS-24-E-2G10	24	22	90,7 %	88,0 %	81,5 %	76,0 %	71,3 %
TCF	36	FSS-36-E-2G10	36	32	91,4 %	88,9 %	84,2 %	83,4 %	79,5 %
TC-D / DE	10	FSQ-10-E-G24q=1 FSQ-10-I-G24d=1	10	9,5	89,4 %	86,4 %	73,1 %	67,9 %	59,4 %
TC-D / DE	13	FSQ-13-E-G24q=1 FSQ-13-I-G24d=1	13	12,5	91,7 %	89,3 %	78,1 %	72,6 %	65,0 %
TC-D / DE	18	FSQ-18-E-G24q=2 FSQ-18-I-G24d=2	18	16,5	89,8 %	86,8 %	78,6 %	71,3 %	65,8 %
TC-D / DE	26	FSQ-26-E-G24q=3 FSQ-26-I-G24d=3	26	24	91,4 %	88,9 %	82,8 %	77,2 %	72,6 %
TC-T / TE	13	FSM-13-E-GX24q=1 FSM-13-I-GX24d=1	13	12,5	91,7 %	89,3 %	78,1 %	72,6 %	65,0 %
TC-T / TE	18	FSM-18-E-GX24q=2 FSM-18-I-GX24d=2	18	16,5	89,8 %	86,8 %	78,6 %	71,3 %	65,8 %
TC-T / TC-TE	26	FSM-26-E-GX24q=3 FSM-26-I-GX24d=3	26,5	24	91,4 %	88,9 %	82,8 %	77,5 %	73,0 %
TC-DD / DDE	10	FSS-10-E-GR10q FSS-10-L/P/H-GR10q	10,5	9,5	86,4 %	82,6 %	70,4 %	68,8 %	60,5 %
TC-DD /	16	FSS-16-E-GR10q	16	15	87,0 %	83,3 %	75,0 %	72,4 %	66,1 %

DDE		FSS-16-I-GR8 FSS-16-L/P/H-GR10q							
TC-DD / DDE	21	FSS-21-E-GR10q FSS-21-L/P/H-GR10q	21	19,5	89,7 %	86,7 %	78,0 %	73,9 %	68,8 %
TC-DD / DDE	28	FSS-28-E-GR10q FSS-28-I-GR8 FSS-28-L/P/H-GR10q	28	24,5	89,1 %	86,0 %	80,3 %	78,2 %	73,9 %
TC-DD / DDE	38	FSS-38-E-GR10q FSS-38-L/P/H-GR10q	38,5	34,5	92,0 %	89,6 %	85,2 %	84,1 %	80,4 %
TC	5	FSD-5-I-G23 FSD-5-E-2G7	5,4	5	72,7 %	66,7 %	58,8 %	49,3 %	41,4 %
TC	7	FSD-7-I-G23 FSD-7-E-2G7	7,1	6,5	77,6 %	72,2 %	65,0 %	55,7 %	47,8 %
TC	9	FSD-9-I-G23 FSD-9-E-2G7	8,7	8	78,0 %	72,7 %	66,7 %	60,3 %	52,6 %
TC	11	FSD-11-I-G23 FSD-11-E-2G7	11,8	11	83,0 %	78,6 %	73,3 %	66,7 %	59,6 %
T5	4	FD-4-E-G5-16/150	4,5	3,6	64,9 %	58,1 %	50,0 %	45,0 %	37,2 %
T5	6	FD-6-E-G5-16/225	6	5,4	71,3 %	65,1 %	58,1 %	51,8 %	43,8 %
T5	8	FD-8-E-G5-16/300	7,1	7,5	69,9 %	63,6 %	58,6 %	48,9 %	42,7 %
T5	13	FD-13-E-G5-16/525	13	12,8	84,2 %	80,0 %	75,3 %	72,6 %	65,0 %

T9-C	22	FSC-22-E-G10q-29/200	22	19	89,4 %	86,4 %	79,2 %	74,6 %	69,7 %
T9-C	32	FSC-32-E-G10q-29/300	32	30	88,9 %	85,7 %	81,1 %	80,0 %	76,0 %
T9-C	40	FSC-40-E-G10q-29/400	40	32	89,5 %	86,5 %	82,1 %	82,6 %	79,2 %
T2	6	FDH-6-L/P-W4,3x8,5d-7/220		5	72,7 %	66,7 %	58,8 %		
T2	8	FDH-8-L/P-W4,3x8,5d-7/320		7,8	76,5 %	70,9 %	65,0 %		
T2	11	FDH-11-L/P-W4,3x8,5d-7/420		10,8	81,8 %	77,1 %	72,0 %		
T2	13	FDH-13-L/P-W4,3x8,5d-7/520		13,3	84,7 %	80,6 %	76,0 %		
T2	21	FDH-21-L/P-W4,3x8,5d-7/		21	88,9 %	85,7 %	79,2 %		
T2	23	FDH-23-L/P-W4,3x8,5d-7/		23	89,8 %	86,8 %	80,7 %		
T5-E	14	FDH-14-G5-L/P-16/550		13,7	84,7 %	80,6 %	72,1 %		
T5-E	21	FDH-21-G5-L/P-16/850		20,7	89,3 %	86,3 %	79,6 %		
T5-E	24	FDH-24-G5-L/P-16/550		22,5	89,6 %	86,5 %	80,4 %		
T5-E	28	FDH-28-G5-L/P-16/1150		27,8	89,8 %	86,9 %	81,8 %		

T5-E	35	FDH-35-G5-L/P-16/1450		34,7	91,5 %	89,0 %	82,6 %		
T5-E	39	FDH-39-G5-L/P-16/850		38	91,0 %	88,4 %	82,6 %		
T5-E	49	FDH-49-G5-L/P-16/1450		49,3	91,6 %	89,2 %	84,6 %		
T5-E	54	FDH-54-G5-L/P-16/1150		53,8	92,0 %	89,7 %	85,4 %		
T5-E	80	FDH-80-G5-L/P-16/1150		80	93,0 %	90,9 %	87,0 %		
T5-E	95	FDH-95-G5-L/P-16/1150		95	92,7 %	90,5 %	84,1 %		
T5-E	120	FDH-120-G5-L/P-16/1450		120	92,5 %	90,2 %	84,5 %		
T5-C	22	FSCH-22-L/P-2GX13-16/225		22,3	88,1 %	84,8 %	78,8 %		
T5-C	40	FSCH-40-L/P-2GX13-16/300		39,9	91,4 %	88,9 %	83,3 %		
T5-C	55	FSCH-55-L/P-2GX13-16/300		55	92,4 %	90,2 %	84,6 %		
T5-C	60	FSCH-60-L/P-2GX13-16/375		60	93,0 %	90,9 %	85,7 %		
TC-LE	40	FSDH-40-L/P-2G11		40	91,4 %	88,9 %	83,3 %		
TC-LE	55	FSDH-55-L/P-2G11		55	92,4 %	90,2 %	84,6 %		
TC-LE	80	FSDH-80-L/P-2G11		80	93,0 %	90,9 %	87,0 %		
TC-TE	32	FSMH-32-L/P-		32	91,4 %	88,9 %	82,1 %		

		2GX24q=3							
TC-TE	42	FSMH-42-L/P-2GX24q=4		43	93,5 %	91,5 %	86,0 %		
TC-TE	57	FSM6H-57-L/P-2GX24q=5 FSM8H-57-L/P-2GX24q=5		56	91,4 %	88,9 %	83,6 %		
TC-TE	70	FSM6H-70-L/P-2GX24q=6 FSM8H-70-L/P-2GX24q=6		70	93,0 %	90,9 %	85,4 %		
TC-TE	60	FSM6H-60-L/P-2G8=1		63	92,3 %	90,0 %	84,0 %		
TC-TE	62	FSM8H-62-L/P-2G8=2		62	92,2 %	89,9 %	83,8 %		
TC-TE	82	FSM8H-82-L/P-2G8=2		82	92,4 %	90,1 %	83,7 %		
TC-TE	85	FSM6H-85-L/P-2G8=1		87	92,8 %	90,6 %	84,5 %		
TC-TE	120	FSM6H-120-L/P-2G8=1 FSM8H-120-L/P-2G8=1		122	92,6 %	90,4 %	84,7 %		
TC-DD	55	FSSH-55-L/P-GRY10q3		55	92,4 %	90,2 %	84,6 %		

▼B

In addition, non-dimmable ballasts not included in table 17 shall be assigned an EEI depending on their efficiency as described in Table 18:

Table 18

Energy efficiency index requirements for non-dimmable ballasts for fluorescent lamps not included in Table 17

ηballast	Energy Efficiency

	Index
≥ 0,94 * EBbFL	A3
≥ EBbFL	A2
≥ 1-0,75*(1-EBbFL)	A2 BAT

Where EBbFL is defined in Annex II.3.g.
Furthermore, dimmable fluorescent lamp ballasts receive EEI classes according to the class into which the ballast would fall when it is operated at the 100 % lumen output, as described in Table 19.

Table 19
Energy efficiency index requirements for dimmable ballasts for fluorescent lamps

Complied class at 100 % lumen output	Energy Efficiency Index of dimmable ballast
A3	A1
A2	A1 BAT

Multi-wattage ballasts shall either be classified according to their efficiency under the lowest (worst) efficiency, or a relevant class shall be indicated for each operated lamp.

B. Second stage requirements

Three years after the entry into force of this Regulation:
for ballasts for high intensity discharge lamps, the efficiency of the ballast as defined in Annex II.1.d shall be indicated.

3. REQUIREMENTS FOR LUMINAIRES FOR FLUORESCENT LAMPS WITHOUT INTEGRATED BALLAST AND FOR LUMINAIRES FOR HIGH INTENSITY DISCHARGE LAMPS

3.1. Luminaire energy performance requirements

A. First stage requirements

One year after this Regulation comes into force:
the power consumption of luminaires for fluorescent lamps without integrated ballast shall not exceed the sum of the power consumption of the incorporated ballasts when the lamps they are normally operating do not emit any light when other possible connected components (network connections, sensors etc.) are disconnected. If they cannot be disconnected, their power shall be measured and deducted from the result.

B. Second stage requirements

Three years after this Regulation comes into force:
Luminaires for fluorescent lamps without integrated ballast and for high intensity discharge lamps shall be compatible with ballasts complying with the third stage requirements, except luminaires with ingress protection grade at least IP4X.
The power consumption of luminaires for high intensity discharge lamps shall not exceed the sum of the power consumption of the incorporated ballasts when the lamps they are normally operating do not emit any light when other possible connected components (network connections, sensors etc.) are disconnected. If they cannot be disconnected, their power shall be measured and deducted from the result.

C. Third stage requirements

Eight years after this Regulation comes into force:
All luminaires for fluorescent lamps without integrated ballast and for high intensity discharge lamps shall be compatible with ballasts complying with the third stage requirements.

3.2. Product information requirements on luminaires

A. First stage requirements

18 months after this Regulation comes into force:

Manufacturers of luminaires for fluorescent lamps without integrated ballast with total lamp lumen above 2 000 lumen shall provide at least the following information on free-access websites and in other forms they deem appropriate for each of their luminaire models. That information shall also be contained in the technical documentation file drawn up for the purposes of conformity assessment pursuant to Article 8 of Directive 2005/32/EC:

(a) if the luminaire is placed on the market together with the ballast, information on the efficiency of the ballast according to Annex III.2.2, in accordance with the ballast manufacturer's data;

(b) if the luminaire is placed on the market together with the lamp, lamp efficacy (lm/W) of the lamp, in accordance with the lamp manufacturer's data;

(c) if the ballast or the lamp are not placed on the market together with the luminaire, references used in manufacturers' catalogues must be provided on the types of lamps or ballasts compatible with the luminaire (e.g. ILCOS code for the lamps);

(d) maintenance instructions to ensure that the luminaire maintains, as far as possible, its original quality throughout its lifetime;

(e) disassembly instructions.

B. Second stage requirements

Three years after this Regulation comes into force:

the information provision requirements of the first stage shall also apply to luminaires for high intensity discharge lamps with total lamp lumen above 2 000 lumen. In addition, all luminaires for high intensity discharge lamps shall indicate that they are designed for either clear and/or coated lamps within the meaning of Annex II.

ANNEX IV

Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Article 3(2) of Directive 2005/32/EC, the authorities of the Member States shall apply the following verification procedure for the requirements set out in Annex III.

▼M1

Member States authorities shall use reliable, accurate and reproducible measurement procedures, which take into account the generally recognised state of the art measurement methods, including methods set out in documents the reference numbers of which have been published for that purpose in the Official Journal of the European Union.

▼B

For lamps

Member State authorities shall test a sample batch of minimum twenty 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 III Part 1, as applicable, to this 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 ballasts and luminaires

Member State authorities shall test one single unit.

The model shall be considered to comply with the provisions set out in Annex III Parts 2 and 3, as applicable, to this Regulation if the results do not exceed the limit values.

Otherwise, three more units shall be tested. The model shall be considered to comply with this Regulation if the average of the results of the latter three tests does not exceed the limit values. Otherwise, the model shall be considered not to comply.

ANNEX V

Indicative benchmarks for fluorescent and high intensity discharge products

(for information)

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

1. Lamp efficacy and lamp life

For single and double capped fluorescent lamps, the benchmark values are the best values included in the tables in Annex III Parts 1.1 and 1.2.

For high-intensity discharge lamps

Metal Halide Lamps (clear and frosted):

Table 20

Indicative rated efficacy and performance values for metal halide lamps (benchmark level)

	Ra ≥ 80	80 > Ra ≥ 60
Nominal Lamp Wattage [W]	Rated Lamp Efficacy [lm/W]	Rated Lamp Efficacy [lm/W]
W ≤ 55	≥ 80	≥ 95
55 < W ≤ 75	≥ 90	≥ 113
75 < W ≤ 105	≥ 90	≥ 116
105 < W ≤ 155	≥ 98	≥ 117
155 < W ≤ 255	≥ 105	
255 < W ≤ 405	≥ 105	

Burning Hours	Lamp Lumen Maintenance Factor	Lamp Survival Factor
12 000	> 0,80	> 0,80

High-pressure sodium lamps (clear and frosted):

Table 21

Indicative rated efficacy and performance values for high pressure sodium lamps (benchmark level)

Nominal Lamp Wattage [W]	Rated Lamp Efficacy [lm/W]
W ≤ 55	≥ 88

55 < W ≤ 75	≥ 91
75 < W ≤ 105	≥ 107
105 < W ≤ 155	≥ 110
155 < W ≤ 255	≥ 128
255 < W ≤ 405	≥ 138

Burning Hours	Lamp Lumen Maintenance Factor	Lamp Survival Factor
16 000	> 0,94	> 0,92

2. Lamp mercury content

The energy efficient fluorescent lamps with the lowest mercury content include not more than 1,4 mg mercury and the energy efficient high-intensity discharge lamps with the lowest mercury content include not more than 12 mg of mercury.

3. Ballast performance

For applications where dimming is beneficial, the benchmarks are as follows:

Fluorescent lamp ballasts with energy efficiency index A1 BAT that are continuously dimmable down to 10 % light output.

Ballasts for dimmable high intensity discharge lamps which can be dimmed down to 40 % light output having ballast efficiency of 0,9 (best known result, actual dimming possibilities may depend on the HID lamp type used with the ballast).

4. Luminaire product information

The following product information is provided on free-access websites and in other forms the manufacturers deem appropriate for benchmark luminaires in addition to the provisions in Annex III.3.2:

CEN flux code of the luminaire or the complete photometric file.

ANNEX VI

Indicative benchmarks for products meant to be installed as office lighting

(for information)

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

1. LAMP BENCHMARKS

1.1. Lamp performance

Lamps have an efficacy according to Annex V.

These lamps have the lamp lumen maintenance factors (LLMF) and lamp survival factors (LSF) in Table 22:

Table 22

Indicative LLMF and LSF for office lighting lamps (benchmark level)

Burning hours	2 000	4 000	8 000	16 000
LLMF	0,97	0,93	0,90	0,90

LSF	0,99	0,99	0,98	0,93

In addition, these lamps are dimmable to 10 % or less of their light output.

1.2. Product information for lamps

The following information is provided on free-access websites and in other forms the manufacturers deem appropriate for lamps:

The information required by Annex III.1.3, as applicable.

2. LIGHT SOURCE CONTROL GEAR BENCHMARKS

2.1. Light source control gear performance

Fluorescent lamp ballasts have an energy efficiency index of at least A1 (BAT) according to Annex III.2.2 and are dimmable.

High intensity discharge lamp ballasts have an efficiency of 88 % (≤ 100 W lamp power) and else 90 % and are dimmable if the sum of lamp powers operated on the same ballast is above 50 W.

Any other types of light source control gear have an efficiency of 88 % (≤ 100 W input power) and else 90 % when measured according to the applicable measurement standards and are dimmable for lamps above total input power 55 W.

2.2. Product information for light source control gear

The following information is provided on free-access websites and in other forms the manufacturers deem appropriate for light source control gear:

Information on the efficiency of the ballast or the applicable type of light source control gear.

3. LUMINAIRE BENCHMARKS

3.1. Luminaire performance

Luminaires have a luminaire maintenance factor LMF > 0,95 in normal office pollution degrees with a cleaning cycle of 4 years.

If they are fluorescent or HID lamp luminaires, they are compatible with at least one lamp type complying with the benchmarks of Annex V.

In addition, these luminaires are compatible with lighting control systems offering the following features:

— presence detection,

— light responsive dimming (for daylight and/or room reflectance variations),

— dimming to accompany changes in illumination requirements (during the working day, over a longer period or due to changes in functionality),

— dimming to compensate for: luminaire pollution, changes in lamp lumen output over its life time and changes in lamp efficacy when the lamp is replaced.

The compatibility can also be ensured by incorporating the appropriate components in the luminaires themselves.

The compatibility or the features offered by the incorporated components is indicated in the luminaire's product documentation.

3.2. Product information on luminaires

The following information is provided on free-access websites and in other forms the manufacturers deem appropriate for each of the luminaire models:

The information required by Annex III.3.2 and Annex V, as applicable.

In addition, for all luminaires, excluding luminaires with bare lamps and no optics, applicable luminaire maintenance factor (LMF) value data is provided with cleaning instructions if needed up to 4 years, using a similar table:

Table 23

Indicative luminaire maintenance factor values (benchmark level)

LMF values

Environment	cleaning intervals in years						
	1,0	1,5	2,0	2,5	3,0	3,5	4,0
Very Clean							
Clean							
Normal (optional)							
Dirty (optional)							

The table is accompanied by a disclaimer that it contains only indicative values that may not reflect the achievable maintenance values in a particular installation.
For luminaires for directional light sources such as reflector lamps or LEDs, only the applicable information is provided, e.g. LLMF × LMF instead of simply the LMF.

ANNEX VII
Indicative benchmarks for products meant to be installed as public street lighting
(for information)
At the time of adoption of this Regulation, the best available technology on the market for the products concerned was identified as follows.
1. LAMP BENCHMARKS
1.1. Lamp performance
Lamps have an efficacy according to Annex V.
These lamps have the lamp lumen maintenance factors (LLMF) and lamp survival factors (LSF) in Table 24:

Table 24
Indicative LLMF and LSF for public street lighting lamps (benchmark level)

Burning hours	2 000	4 000	8 000	16 000
LLMF	0,98	0,97	0,95	0,92
LSF	0,99	0,98	0,95	0,92

In addition, these lamps are dimmable to at least 50 % of their light output when the rated lamp lumen output is above 9 000 lumen.
1.2. Product information for lamps
The following information is provided on free-access websites and in other forms the manufacturers deem appropriate for lamps:
The information required by Annex III.1.3, as applicable.
2. LIGHT SOURCE CONTROL GEAR BENCHMARKS
2.1. Light source control gear performance
Fluorescent lamp ballasts have an energy efficiency index of at least A1 BAT according to Annex III.2.2 and are dimmable.
High intensity discharge lamp ballasts have an efficiency of above 87 % (≤ 100 W lamp power) and else above 89 % measured according to Annex II and are dimmable if the sum of lamp powers operated on the same ballast is above or equal to 55 W.

Any other types of light source control gear have an efficiency of above 87 % (≤ 100 W input power) and else above 89 % when measured according to the applicable measurement standards and are dimmable for lamps equal or above total input power 55 W.

2.2. Product information for light source control gear

The following information is provided on free-access websites and in other forms the manufacturers deem appropriate for light source control gear:

Information on the efficiency of the ballast or the applicable type of light source control gear.

3. LUMINAIRE BENCHMARKS

3.1. Luminaire performance

Luminaires have an optical system that has an ingress protection rating as follows:

— IP65 for road classes ME1 to ME6 and MEW1 to MEW6

— IP5x for road classes CE0 to CE5, S1 to S6, ES, EV and A

The proportion of the light emitted by an optimally installed luminaire going above the horizon should be limited to:

Table 25

Indicative maximum Upward Light Output Ratio (ULOR) values per road class for street lighting luminaires (at benchmark level)

Road classes ME1 to ME6 and MEW1 to MEW6, all lumen outputs	3 %
Road classes CE0 to CE5, S1 to S6, ES, EV and A:	
— 12 000 lm ≤ light source	5 %
— 8 500 lm ≤ light source < 12 000 lm	10 %
— 3 300 lm ≤ light source < 8 500 lm	15 %
— light source < 3 300 lm	20 %

In areas where light pollution is of concern, the maximum proportion of the light going above the horizon is not more than 1 % for all road classes and lumen outputs.

Luminaires are designed so that they avoid emitting obtrusive light to the maximum extent. However, any improvement of the luminaire aiming at reducing the emission of obtrusive light is not to the detriment of the overall energy efficiency of the installation for which it is designed.

If they are luminaires for fluorescent or high-intensity discharge lamps, they are compatible with at least one lamp type complying with the benchmarks of Annex V.

Luminaires are compatible with installations equipped with appropriate dimming and control systems that take account of daylight availability, traffic and weather conditions, and also compensate for the variation over time in surface reflection and for the initial dimensioning of the installation due to the lamp lumen maintenance factor.

3.2. Product information on luminaires

The following information is provided on free-access websites and in other forms the manufacturers deem appropriate for the relevant models:

(a) the information required by Annex III.3.2 and Annex V, as applicable;

(b) Utilisation Factor values for standard road conditions in tabular form for the defined road class. The table contains the most energy efficient UF values for different road widths, different pole

heights, maximum pole distances, luminaire overhang and inclination, as appropriate for the given road class and luminaire design;
(c) installation instructions for optimising the Utilisation Factor;
(d) additional installation recommendations to minimise obtrusive light (if not conflicting with UF optimisation and safety);
(e) for all luminaires, excluding luminaires with bare lamps and no optics, applicable luminaire maintenance factor (LMF) value data is provided according using a similar table:

Table 26
Indicative luminaire maintenance factor values (benchmark level)

LMF values							
Pollution category	Exposure time in years						
	1,0	1,5	2,0	2,5	3,0	3,5	4,0
High							
Medium							
Low							

For luminaires for directional light sources such as reflector lamps or LEDs, only the applicable information is provided, e.g. LLMF × LMF instead of simply the LMF.

(1) OJ L 191, 22.7.2005, p. 29.
(2) OJ L 37, 13.2.2003, p. 19.
(3) OJ L 279, 1.11.2000, p. 33.
(4) OJ L 100, 19.4.1994, p. 1.
(5) OJ L 23, 28.1.2000, p. 57.
(6) OJ L 374, 27.12.2006, p. 10.
(7) OJ L 157, 9.6.2006, p. 24.
(8) OJ L 169, 12.7.1993, p. 1.
(9) OL L 187, 16.7.1988, p. 1.