COMMISSION OF THE EUROPEAN COMMUNITIES

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Draft

COMMISSION REGULATION (EC) No ../..

Of […]

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

EXPLANATORY MEMORANDUM

1. CONTEXT OF THE PROPOSAL

Grounds for and objectives of the proposal

Directive 2005/32/EC of the European Parliament and of the Council lays down a framework for the Commission, assisted by a Regulatory Committee, to set eco-design requirements for energy-using products. Ecodesign requirements are requirements that the products covered by implementing measures must meet in order to be placed on the market with the aim of improving their environmental performance.

Article 16 of Directive 2005/32/EC states that "the Commission shall, as appropriate, introduce by anticipation (…) implementing measures starting with (…) lighting in both the domestic and tertiary sectors" in accordance with the criteria of Article 15 (in particular significant volume of sales and trade, significant environmental impact, significant potential for improvement and assessment of impacts).

For the purposes of this explanatory memorandum, the products targeted by the regulation will be referred to as "tertiary sector lighting products". They include fluorescent lamps without integrated ballast, high intensity discharge lamps, ballasts and luminaires for these lamps types, as well as office lighting and public street lighting products.

A technical, environmental and economical analysis ("preparatory study")[1] has shown that:

(i) tertiary sector lighting products are placed in large quantities on the Community market;

(ii) the environmental impact (energy use in the use phase, mercury content and light pollution[2]) of tertiary sector lighting products in the Community is significant;

(iii) there are wide disparities in the environmental performance of tertiary sector lighting products;

and cost effective technical solutions exist which could significantly improve the environmental impacts. Pursuant to Article 15 of Directive 2005/32/EC, tertiary

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[1] Preparatory Studies for Eco-design Requirements for EuPs. Lot 8: Office Lighting (April 2007) Lot 9: Public Street Lighting (January 2007). Both by VITO and subcontractors. Available from the EUROPA website: http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm

[2] "Light pollution" is defined as the sum of all adverse impacts of artificial light on the environment, including the impact of obtrusive light (the part of the light from a lighting installation that does not serve the purpose for which the installation was designed). Its impact could not be properly assessed in the preparatory study on street lighting, because internationally agreed scientific methods for measuring its environmental impact are still in an early stage of development. Therefore, although light pollution is considered to have some environmental impact, it cannot be quantified in this assessment.

sector lighting products shall therefore be subject to an ecodesign implementing measure

General context

Although cost-effective solutions for improving the life cycle environmental impact related to tertiary sector lighting products exist, market forces have resulted in a market penetration of products with environmental performance lower than it could be. This market failure is mainly related to the fact that the benefits are often irrelevant to the person making the purchasing decision (principal-agent problem[3] and issues of payback on investment in relation to political visibility[4]). Moreover, market forces have little impact on product environmental improvements not accompanied by cost savings over the product's life cycle, such as reducing their mercury content.[5]

It is estimated that a total of 1,6 billion lighting points installed in tertiary sector lighting had an annual electricity consumption of 200 TWh in 2005 in the EU-27. This corresponds to an annual spending of 27,2 billion Euro[6], and annual 79,9 million tons of CO2 emissions.[7]

The total mercury content of the lamps installed in tertiary sector lighting amounts to approximately 12,6 tons.

Without taking appropriate countermeasures ("no action" specifically on tertiary sector lighting products) it is expected that electricity consumption in tertiary sector lighting products will rise to 260 TWh per year in 2020 and total mercury content will rise to 18,6 tons.

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3 When it comes to buildings, the deployment of more energy efficient lighting infrastructures in the commercial and industrial sectors is impaired by the fact that industrial or commercial buildings are generally built by construction companies with the sole purpose to be lent or sold, that is to say, the costs for operating the building, including the electricity costs for lighting, are not incurred by the investor. For buildings to be successfully placed on the market, their price must be competitive and, unless prospective tenants or buyers explicitly require the building to be equipped with the most energy efficient lighting infrastructures, the installation of more energy efficient lighting systems will not be a priority.

4 The division of an administration in charge of tendering/purchase of equipment is almost never the same as the one paying for the running costs. An investment aimed at installing more energy efficient street lighting infrastructures could be discouraged by the consideration that the resulting benefits are likely to be reaped by the next administration due to longer return on investment periods. This is a problem that could also arise when the introduction of more energy efficient lighting infrastructures does not involve any disbursement by Local Authorities. Local decision makers often have the alternative of bringing light (quality of life, security…) to more people versus efficient lighting only for some.

5 Although they go largely hand in hand, there is a point beyond which light pollution reduction could go against the efforts to increase energy efficiency of street lighting luminaires (see the Street lighting preparatory study's Chapter 6.1.4)

6 Average electricity price in the Community 2005: of 0.136 €/kWh

7 Average specific Community EC emissions in 2003: 400g CO2 per kWh (CommunityRELECTRIC, Environmental Statistics of the European Electricity Industry, Trends in Environmental Performance 2003-2004); this figure is higher if e.g. mining related effects are taken into account (MEEuP: plus 10%)

The main reason for this increase from 2005 is that the number of lighting points in tertiary sector lighting is expected to increase to 2,3 billion due to infrastructural development (new buildings and roads) and due to a demand for more light in existing infrastructures.

The environmental impact of the so-called "light pollution" is not quantifiable.

It is estimated that the proposed ecodesign requirements would lead to a reduction of approximately 38 TWh of electricity consumption per year by 2020 in the Community and to a reduction of approximately 14 tons of the mercury content of the installed lamp base in 2020.[8]

Following Member States and stakeholder comments and considering that eco-design requirements apply to products put on the market irrespective of where they are used, it was decided to integrate the requirements on public street lighting and high-intensity discharge lighting products and on fluorescent and office lighting products into a single draft measure on tertiary sector lighting products.

There is a parallel preparatory process on an implementing measure on general lighting products (launched as "domestic lighting").

- **Existing provisions in the area of the proposal**

In general, the energy consumption of tertiary sector lighting products is not addressed by Community legislation, except for the following products:

- ballasts for fluorescent lamps, for which minimum energy efficiency requirements were set in Directive 2000/55/EC (now an implementing measure of the Ecodesign Directive). This directive has an ongoing effect on the installed ballast base, as due to long luminaire and magnetic ballast lifetimes (about 20 years) it will have fully exercised its impact only by 2025. However, the preparatory study on office lighting and the impact assessment have shown that there is further improvement potential, and that more demanding minimum energy efficiency requirements as compared to Directive 2000/55/EC would be appropriate. Since the legal form of this Regulation is different, and also the content of the Directive should be revised in conjunction with complementary requirements on lamps and luminaires, it is proposed to repeal the Directive and to integrate its amended provisions into this Regulation; and

- fluorescent lamps without integrated ballast, for which both mandatory energy labelling (Directive 98/11/EC) and voluntary ecolabelling criteria (Regulation 2002/747/EC) exist. However, since nearly all available fluorescent lamps belong to the class A of the energy label (the remainder are in class B), and the ecolabel refers to the energy label, there is currently no product differentiation

[8] When comparing this estimate to the ones found in the two preparatory studies, it should be noted that the studies assessed the impacts only for the products installed in office and public street lighting. The Regulation will affect also products installed in other applications, therefore the impact of the measure will be larger (e.g. it is estimated that the stock of fluorescent lamps installed in office lighting is only about one sixth of the total stock of fluorescent lamps covered by this Regulation).

that could achieve the improvement potential of switching from less efficient fluorescent lamps to the more efficient ones.

The Energy Performance of Buildings Directive (2002/91/EC) requires Member States to set minimum energy performance requirements for new buildings or for major renovations of large buildings (at least 1000m2). Lighting is mentioned as one of the applications that have to be included in building energy use calculation.

However, the effect of this directive on tertiary sector lighting products is likely to be limited because of the following reasons:

a) There are no lighting-specific requirements in the Directive and it is left to the Member States, or failing that, to the building planners themselves to use or not use the potential of energy efficient lighting systems in complying with the requirements.

b) As the requirement only concerns large buildings that are new or undergoing major renovation, it only affects a limited portion of products installed in indoor lighting,

c) Outdoor (public street) lighting is out of scope,

d) The Directive targets the energy performance of entire buildings and not individual products. Buildings' efficiency improvements may be achieved through other means than incorporating more efficient (lighting) products.

The Energy End-use Efficiency and Energy Services Directive (2006/32/EC)requires the Member States to adopt national energy efficiency action plans and public procurement rules for increased efficiency. For both, lighting is a recommended but not mandatory area of action, which may target both indoor and outdoor lighting, set system level requirements or promote energy efficient products. At the product level, Member States have little possibility to set minimum efficiency requirements in national legislation due to internal market rules. The implementing measures of the Ecodesign Directive are meant to set out harmonised product requirements across the Community. Other possible actions on products, such as public procurement rules, fiscal incentives, voluntary agreements with retailers, promotional campaigns are eligible but have so far been announced in the national energy efficiency action plans of only a few Member States.[9] Some improvement could also be expected due to the development of Energy Services Companies as a result of the Directive, but it is uncertain to what extent that would affect lighting systems and more particularly the installed lighting products themselves, without further supporting measures. At the time of drafting this proposal, the effect of Directive 2006/32/EC on tertiary sector lighting products looked likely to be limited and difficult to quantify.

In any case, both Directives (2002/91/EC on Buildings and 2006/32/EC on End-use Energy Efficiency and Energy Services) would actually benefit from product level minimum efficiency and information requirements on tertiary sector lighting products, as they are the building blocks of the more efficient lighting systems covered by both directives.

[9] Examples include national energy effiency action plans of the United Kingdom, Italy and Romania.

The mercury content of lamps typically used in tertiary sector lighting (fluorescent lamps without integrated ballast and high-intensity discharge lamps) is regulated by the Directive on the Restriction of Hazardous Substances - RoHS - (2002/95/EC). The Directive generally forbids the use of mercury in electronic equipment, however in the Annex on exemptions, mercury is tolerated in fluorescent lamps up to a certain limit, while special purpose fluorescents not used in general lighting and "other lamps" (including high-intensity discharge lamps) are totally exempted. Mercury content of fluorescent lamps without integrated ballast is further limited in the requirements for the voluntary ecolabel (Regulation 2002/747/EC). The preparatory studies have shown that high-pressure mercury vapour lamps and halophosphate fluorescent lamps have the highest mercury content. Adopting energy efficiency requirements that would result in phasing them out would also have a beneficial impact on the mercury content of the lamp stock. However, as the exemptions (currently under review) of the RoHS Directive cover more lamp types than those used in general lighting and covered by the planned Ecodesign implementing regulation, it is considered appropriate to leave the setting of specific mercury content requirements on lamps to the ongoing review of exemptions under the RoHS Directive. Nevertheless, mercury content benchmarks are identified for the lamp types covered by the proposed Ecodesign implementing Regulation and are a concrete input for the revision of the RoHS.

In principle the Directive on Waste Electric and Electronic Equipement (WEEE, 2002/96/EC) regulates the way products (including lighting equipment) should be handled when they are discarded at end of life, whereas the Ecodesign Directive addresses products in the design phase. The recommended restriction on mercury content of lamps in the design phase would ensure that the environmental impact of the disposed lamps is reduced. The rate of recycling is dependant on the implementation of the WEEE directive. Ecodesign requirements may have a beneficial effect also on the amount of discarded lamps per year through lifetime requirements.

There is no Community legislation on the so-called "light pollution".

- **Consistency with the other policies and objectives of the Union**

Directive 2005/32/EC is an important instrument to achieve the objective of 20% increase of energy efficiency by 2020, and its implementation is one of the priorities of the Commission's Energy Efficiency Action Plan. Furthermore, implementation of Directive 2005/32/EC contributes to the Community's binding target to attain a reduction of greenhouse gases by at least 20% in 2020, or 30% in 2020 if there is an international agreement which commits other developed countries to comparable emissions reductions. The proposed implementing Regulation is an important contribution to this process. It is also fully consistent with the Sustainable Consumption, Production and Industrial Policy Action Plan.

2. CONSULTATION OF INTERESTED PARTIES AND IMPACT ASSESSMENT

- **Consultation of interested parties**

Stakeholders were consulted from the very beginning of the preparatory studies, and in the framework of the Ecodesign Consultation Forum as required by Article 18 of the Directive.

On 22 June 2007 and 18 December 2007, the Ecodesign Consultation Forum held two meetings, on public street lighting and high-intensity discharge lighting products and on fluorescent and office lighting products respectively. Building on the results of the preparatory studies, Commission staff presented working documents suggesting options for ecodesign requirements for tertiary sector lighting products.[10] Working documents submitted to the members of the Consultation Forum were also sent informally to the secretariats of the ENVI (Environment, Public Health and Food Safety) and ITRE (Industry, Research and Energy) Committees of the European Parliament. The working documents were published on ecodesign website of Directorate General Energy and Transport of the European Commission, and they were included in the European Institutions' collaborative workplace system "CIRCA"[11] alongside the stakeholder comments received in writing before and after the meetings.

- **Collection and use of expertise**

Scientific/expertise domains concerned

External expertise on tertiary sector lighting products was mainly gathered through two studies providing a technical, environmental and economic analysis (in the following called "preparatory study"), which were carried out by consortia of external consultants[12] on behalf of the Commission's Directorate General for Energy and Transport (DG TREN).

Methodology used

The methodology followed the provisions of the Directive, in particular Article 15 and Annexes II and I. The technical, environmental and economic analysis followed the structure of the "MEEuP" ecodesign methodology[13] developed for the Commission's Directorate General for Enterprise and Industry and endorsed by stakeholder.

Main organisations/experts consulted

The preparatory studies were conducted in an open process that took into account input from relevant stakeholders including manufacturers and manufacturing

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10 Available on DG TREN's ecodesign website: http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm#consultation_forum

11 Communication & Information Resource Centre Administrator, http://circa.europa.eu

12 EuP preparatory studies "Lot 8: Office lighting", by VITO, final report of April 2007; "Lot 9: Public street lighting", by VITO, final report of January 2007, documentation available on the ecodesign website of the Commission's Directorate General Energy and Transport http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm.

13 "Methodology for the Ecodesign of Energy Using Products", Methodology Report, final of 28 November 2005, VHK, available on DG TREN and DG ENTR ecodesign websites: http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm http://ec.europa.eu/enterprise/eco_design/index_en.htm

associations, environmental NGOs, consumer organizations, Community/EEA Member State experts and international organizations such as the International Energy Agency (IEA).

Summary of advice received and used

No potentially serious risks with irreversible consequences were raised by any stakeholder, nor were any identified during the preparatory work. The technical, market and economical analysis carried out in the framework of the preparatory study resulted in recommendations on ecodesign requirements on tertiary sector lighting products. These recommendations were used as a basis for suggesting possible ecodesign requirements to the Consultation Forum.

Means used to make the expert advice publicly available

The preparatory studies were given a dedicated website[14] where interim results and further relevant materials were published regularly for timely stakeholder consultation and input. Written submissions from stakeholders are listed in the final reports. The study website was promoted on the ecodesign-specific websites of the Transport and Energy DG and the Enterprise and Industry DG. The Commission hosted open consultation meetings for stakeholders directly affected in Brussels on 18 December 2006 and on 2nd April 2007 to discuss and validate the preliminary results of the studies. The written submissions received through the Consultation Forum process are available in the Commission's CIRCA system. The minutes of the Forum meetings are available on the Transport and Energy DG 's website[15].

- **Impact assessment**

An impact assessment was carried out pursuant to Article 15 (4.b) of Directive 2005/32/EC. Several options for improving the environmental impact of tertiary sector lighting products were considered.

- Option 1: Repeal of existing legislation (Directive 2000/55/EC on the energy efficiency of ballasts for fluorescent lamps).

- Option 2: No Community action (Legislation currently in place would not be amended, no new legislation would be adopted.)

- Option 3: Self regulation.

- Option 4: Labelling targeting the environmental performance of tertiary sector lighting products (energy label, ecolabel) without accompanying ecodesign requirements.

- Option 5: Ecodesign implementing regulation on tertiary sector lighting products

[14] www.eup4light.net

[15] Available on DG TREN's ecodesign website: http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm#consultation_forum

Option 5(a): Include benchmarks for products intended for office or public street lighting

Option 5(b): Include labelling targeting their environmental performance (energy label, ecolabel)

Options 1 to 4 were discarded, the main reason being that they would not respect the specific mandate of the Legislator.

Option 5 (b) was also discarded for the following reasons:

– high-intensity discharge lamps and fluorescent lamps without integrated ballast used in tertiary sector lighting all belong to current energy classes A and B. It is planned to revise the energy label for lamps to better differentiate current class A and B products. However, as the label is planned to be extended to cover all lamps types in general lighting (including the currently excluded reflector lamps and low voltage lamps), the revision cannot take place before the Commission has finished examining those lamp technologies, in the course of 2009. In addition, the adoption of labelling requirements for tertiary products would need to wait for the adoption of the extension of the scope of the 92/75/EEC Directive currently restricted to household appliances and which is currently under review.

– for the energy labelling of luminaires, ballasts for high-intensity discharge lamps and for fluorescent lamps without integrated ballast the same limitations would apply in particular regarding the scope of the 92/75/EEC Directive. Therefore, this sub-option was also discarded.

Conclusion of the impact assessment

It was concluded that three stages for ecodesign requirements on tertiary sector lighting products, (becoming effective 1 year, 3 years and 8 years after entry into force of the proposed Regulation) would provide the appropriate balance between:

- The need to improve the environmental impact of the affected equipment
- The costs (increased product prices) and benefits (reduction of electricity consumption) for the user/consumer and
- The burden on manufacturers (in particular due to the phaseout of magnetic ballasts).

It is estimated that in 2020 the mandatory requirements set out by this Regulation will lead to a reduction of electricity consumption of 38 TWh compared to the "no action" scenario above yielding annual CO2 emission savings of about 15 mln tons, and reductions of further electricity production related environmental impacts (e.g. SO2, NOx, heavy metals). The electricity savings correspond roughly to the final electricity consumption of Romania in 2005, the savings of electricity costs are worth approx. 5,2 bln € in electricity prices of the year 2005.[16]

[16] Average electricity price in 2005 in EU-25: 0,08 Cent/kWh for public street lighting, 13.6 Cent/kWh for other end uses.

3. LEGAL ELEMENTS OF THE PROPOSAL

- **Summary of the proposed action**

Scope

The measure covers fluorescent lamps without integrated ballast, high-intensity discharge lamps, and ballasts and luminaires used with such lamps.

Eco-design measures set out requirements for putting products on the market. Therefore requirements would be applicable to the lighting products independently from their application area (including to those products when marketed for use in domestic applications, thereby increasing the positive impact of the measure).

Lamps for special applications (photocopiers, LCD screens, beamers, stadium lighting, pet care lamps, food lighting lamps etc.) are excluded from the scope.

Some product information requirements would affect products having a higher light output (typically used in professional applications)

Mandatory requirements

The following aspects are addressed by requirements:

Lamps:
- energy efficiency
- lamp lumen maintenance factor (speed of aging)
- lamp survival factor (lifetime)
- product information

Ballasts:
- energy efficiency
- no-load consumption (standby)
- dimmability
- product information (including an energy efficiency index)

Luminaires:
- product information
- compatibility with lamps and ballasts

Timing and revision:

Stage 1 (One year after entry into force):

Setting efficiency requirements that would result in the phasing out of the T8 type halophosphate lamps and high-pressure mercury vapour lamps (they can be replaced by other lamps in the same luminaires) and ensuring that no substandard lamps can enter the market. The one year transition period after entry into force should allow industry to adapt their production.

Stage 2 (Three years after entry into force):

Setting efficiency requirements that would result in the phasing out of T12 and T10 type halophosphate lamps (luminaire changes could be needed in some cases), and of the least efficient high pressure sodium and metal halide lamps (which does not affect the availability of replacement lamps for luminaires). Setting luminaire requirements that would allow for a planned phasing out of magnetic ballasts and of inefficient replacement lamps.

Stage 3 (Eight years after entry into force):

Setting efficiency requirements that would result in the phasing out of inefficient replacement lamps and magnetic ballasts, even if the luminaires will have to be changed.

Revision

It is planned to examine the necessity to revise the measure (including the provisions planned for Stage 3, if needed), at the latest 5 years after adoption.

Rationale for the mandatory requirements

The ecodesign requirements proposed are tailor-made for the different types of lamps covered by the measure (high pressure sodium, T8 fluorescent, compact fluorescent with non-integrated ballast etc.), in order to achieve the maximum improvement potential within each technology. The alternative to adopt one single requirement valid for all the technologies would have resulted in setting out the lowest common denominator, because on the one hand it is not acceptable to leave only the most efficient of these technologies on the market and on the other hand, depending on the application, different technologies may be needed. For example, the colour rendering of the most efficient high pressure sodium lamps widely used in public street lighting is not appropriate for display lighting which requires - less efficient - (metal halide) lamps.

For lamps, the mandatory requirements would allow a phasing out of the least efficient high-pressure mercury vapour lamps and of the halophosphate fluorescent lamps.

It is proposed to plan the phasing out in Stage 3 (8 years after adoption of the measure) of magnetic ballasts for fluorescent lamps so that only efficient ballasts would remain on the market. Magnetic ballasts are less efficient than quality electronic ballasts, and they cannot be integrated into intelligent lighting systems

(with dimming). However, in some harsh external conditions (climate, vibrations, current variations etc.) they are still preferred to electronic ballasts. It is therefore proposed to have a long phase out period for magnetic ballasts for fluorescent lamps until there is a wide-spread use of electronic ballasts coping with extreme conditions. Nevertheless, already from Stage 2 (three years after entry into force) the use of magnetic ballasts for fluorescent lamps would be restricted to luminaires that are designed to operate in harsh conditions. Stage 3 would also phase out replacement lamps for inefficient luminaires (including those operating on magnetic ballasts for fluorescent lamps). As the lifetime of lamps is much shorter than that of luminaires (3 to 4 years versus 20 to 40), this would entail that already installed inefficient luminaires (or sometimes only the ballasts in the luminaires) are replaced when spare lamps disappear from the market. Otherwise inefficient luminaires could be still present in the installed base in significant numbers in 2030. In spite of the upfront costs to the end-user, return on investment and lower life-cycle costs would still be ensured, especially if the replacement can be planned well in advance (hence the long transition period of 8 years for Stage 3).

Retrofit high pressure sodium lamps are likely to replace high pressure mercury vapour lamps 1 year after entry into force, as they can operate on the same ballast. However, as these lamps are not very efficient, their phase-out is scheduled for 6 years after the introduction of the measure. To replace them, it is not necessary to replace the luminaire (although even more energy could be saved), it is enough to change the ballast to install a more efficient lamp. Therefore the end-users concerned (municipalities and factories) can be prepared for the replacement under a shorter timeframe, hence the forced ballast replacement is planned after 6 and not 8 years.

The review planned within 5 years of the adoption of the measure would give time to stakeholders and the Commission to assess whether the ultimate ban of magnetic ballasts and the forced replacement of luminaires should be postponed or maintained. The review within 5 years would be timely also due to the substantial changes likely to take place in the tertiary sector lighting products market with the likely advent of LED light sources.

The Energy Efficiency Index as product information for ballasts was initially developed by European industry and has been used for years on a voluntary basis. It informs professional lighting designers on the efficiency of the ballasts they plan to incorporate into the lighting systems they set up. The format of the classification slightly differs from the standard A-G classes of the energy label. As the targets of this indexing are not the average consumers but professional users, it is not necessary/appropriate to use the Energy Labelling Directive 92/75/EEC and the index classes used by European industry can be repeated in this Regulation while updating it with new top-level categories, in order not to create unnecessary burdens. The display of the Energy Efficiency Index is proposed to be made mandatory on request of the European industry , in order to exclude freeriders.

Benchmarks for fluorescent and high intensity discharge products

Benchmark values referred to in the measure were identified on the basis of information gathered during the preparation of the measure. They indicate the level attained by the best products and/or technology available on the market. This gives a

view on the possible level for upgraded requirements when the measure is being reviewed in 5 years.

Benchmarks for products installed in office lighting and public street lighting

Some identified eco-design improvements for products used for office and public street lighting applications are not appropriate for the same product when used in other applications (e.g. limiting the light lost to the sky only makes sense in outdoor lighting, but the same luminaire can often be used in indoor lighting too). Considering that under the Ecodesign Directive (legal base Article 95 of the Treaty), requirements apply to all products placed on the market, complementary requirements on how the products are installed and maintained should be set out essentially in other regulatory instruments. In particular installation requirements for street lighting need to take into account specific (local) needs which are best known and regulated by (local) public authorities.

With the proposed regulation, the aim is to further improve the environmental impact of tertiary sector lighting products meant to be installed in public street and office lighting by setting specific – non Community binding - benchmarks for those products. Installation requirements at local or national level (e.g. stemming from the provisions of the Energy Services Directive 2006/32/EC) could then require in their performance criteria for these specific applications products that respect the office lighting or public street lighting benchmarks set out in this Regulation.In addition to the parameters covered under the mandatory requirements, benchmarks are set for the following luminaire parameters:

– luminaire maintenance factor (how fast the optical system gets dirty)

– compatibility with intelligent control systems (presence detection, light responsive dimming etc.)

For public street lighting luminaires only:

– ingress protection rating of the optical system (protection against water and dust)

– light distribution requirements (determining how much light can be lost to the sky)

- **Legal basis**

The proposed Regulation is an implementing measure pursuant to Directive 2005/32/EC, and in particular Article 15 (1) thereof. The Directive is based on Article 95 of the Treaty

- **Subsidiarity principle**

The adoption of different ecodesign measures on tertiary sector lighting products by individual Member States would lead to obstacles to the free movement of goods within the Community. Such measures must therefore have the same content throughout the Community. In line with the principle of subsidiarity, it is thus appropriate that the measures in question are adopted at Community level

- **Proportionality principle**

In accordance with the principle of proportionality, this measure does not go beyond what is necessary in order to achieve the objective

- **Choice of instruments**

Proposed instruments: Regulation

The proposed form of action is a Commission Regulation (implementing Directive 2005/32/EC), because the objectives of the action can be achieved most efficiently by fully harmonized requirements (including timely entering into effect) throughout the Community, ensuring free movement of compliant equipment

4. BUDGETARY IMPLICATION

The proposal has no implication for the Community budget

5. ADDITIONAL INFORMATION

- **Repeal of existing legislation**

The adoption of the proposal will lead to the repeal of Directive 2000/55/EC. See "Existing provisions" under point 1.

- **Review/revision/sunset clause**

The proposal includes a review clause

- **Trade implications**

WTO/TBT will be notified to ensure that no barrier to trade is introduced

- **European Economic Area**

The proposed act concerns an EEA matter and should therefore extend to the European Economic Area.

- **Detailed explanation of the proposal**

Article 2: Definitions are provided here only for the terms used in the Articles, necessary to define the scope of the Regulation. The more technical terms used in the requirements and in the benchmarks set out in the Annexes are defined in Annex II.

Article 3 and 6: Ecodesign requirements and benchmarks are set with simple reference to Annex III, V, VI and VII, which contain the actual requirements and benchmarks.

Article 5: A verification procedure for market surveillance purposes already exists for the efficacy of fluorescent lamps without integrated ballast, set out in a harmonised standard (EN 50285) providing compliance with measurements under

the lamp energy label directive (98/11/EC). By including this Article and Annex IV, the verification procedure is extended to other lamps covered by this Regulation. Another verification procedure is defined for ballasts and luminaires.

Article 7: The explanation of the repeal of Directive 2000/55/EC on ballasts is provided under "Existing provisions in the area of the proposal" in section 1 above.

Annex I: The product categories that are exempted from all the provisions of the Regulation are given here. Requirements determined according to the performance parameters of general lighting are not appropriate for the special purpose products (e.g. used in projectors, screen backlights, car headlights etc.). Directional light sources need special requirements taking into account their optical efficiency and should be covered later. The exemptions are as much as possible defined through technical parameters (lamp caps, lamp dimensions, light spectrum specificities) to avoid creating loopholes.

Annex II: The measured parameters and the more technical terms used in the other Annexes are defined here. Measurements have to be reliable, accurate and reproducible. Mandates for corresponding harmonised standards will be issued. In order to allow sufficient time for the development of a measurement procedure for ballasts for high intensity discharge lamps, requirements on those ballasts are only set from Stage 2 (3 years after entry into force).

Annex III: Sets out the mandatory requirements on fluorescent and high intensity discharge lighting products explained under "Legal elements of the proposal". Further requirements are set on product information. Annex II Part 2 of Directive 2005/32/EC stipulates that the information required by the implementing measures should "influence the way the EuP is handled, used or recycled by parties other than the manufacturer". In the case of professional lighting, it is particularly relevant to provide detailed product information that allows designers and installers to better integrate the products into lighting systems for optimal performance and energy efficiency. Such information does not need to be provided on every product, it is sufficient to require that it is supplied by the manufacturers on free-access websites and optionally in catalogues.

Annex IV contains provisions on the verification procedure to be applied by the Member States' authorities when performing market surveillance checks referred to in Directive 2005/32/EC, Article 3 (2)

Annex V: Benchmarks are indicated here for parameters where Annex III did not already raise the bar to benchmark level in the second or third stage of requirements (i.e. lamp efficacy). Recommendations on benchmarks are also given for the forthcoming review of the 2002/95/EC lamp mercury content exemptions. The product information suggested for benchmark luminaires requires measurements that are not normally carried out by smaller luminaires manufacturers, but that could provide valuable information to the lighting designer planning to incorporate the luminaires in a lighting system. As these parameters also define the optical efficiency of the luminaire, they could be the basis for requirements in later EuP implementing measures.

Annex VI and VII: they include the benchmarks for products to be installed as office lighting or public street lighting. Their role is explained above in section 3 “Legal elements of the proposal”. To be noted that these benchmarks are valid not only for fluorescent or high intensity discharge lighting products, but also for any kind of lighting technology intended for these application areas. As far as public street lighting is concerned, the impact of the so-called "light pollution" could not be properly assessed, because internationally agreed scientific methods for measuring its environmental impact are in an early stage of development. Therefore, although light pollution is considered to have some environmental impact, its significance could not be determined. However, if the benchmarks for public street lighting luminaires are applied, it will result not only in an increased efficiency of the luminaire but also in lower “light pollution” levels.

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COMMISSION REGULATION (EC) No …/…

Of …

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)

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[17] 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.

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17 Directive 2005/32/EC (OJ L 191, 22.7.2005, p. 29.)

(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.

(16) 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.

(17) In conformity with Article 8(2) 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 of Directive 2005/32/EC and the management system for assessing conformity set out in Annex V of Directive 2005/32/EC.

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

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

(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, 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[18] is an

[18] OJ L 279, 1.11.2000, p. 33

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 fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps as defined in Article 2, even when they are integrated into other energy-using products covered by Directive 2005/32/EC.

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 stabilized 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 of Directive 2005/32/EC or the management system set out in Annex V of 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 and present the results of this review to the Ecodesign Consultation Forum.

Article 9
Entry into force

This Regulation shall enter into force on the 20th day following that of 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.

Article10

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

Done at Brussels,

For the Commission

Member of the Commission

STRUCTURE OF THE ANNEXES

Annex I **General exemptions**

Annex II **Parameters and definitions for the purposes of Annexes I and III to VII**

Annex III **Ecodesign requirements for fluorescent and high intensity discharge lamps and ballasts and luminaires able to operate such lamps**

1. Lamp requirements

1.1 Lamp efficacy requirements

A. First stage requirements

B. Second stage requirements

C. Third stage requirements

1.2 Lamp performance requirements

A. First stage requirements

B. Second stage requirements

C. Third stage requirements

1.3. Product information requirements on lamps

2. Ballast requirements

2.1 Ballast energy performance requirements

A. First stage requirements

B. Second stage requirements

C. Third stage requirements

2.2 Product information requirements on ballasts

A. First stage requirements

B. Second stage requirements

3. Luminaire requirements

3.1 Luminaire energy performance requirements

A. First stage requirements

B. Second stage requirements

C. Third stage requirements

3.2 Product information requirements on luminaires

A. First stage requirements

B. Second stage requirements

Annex IV **Verification procedure for market surveillance purposes**

Annex V **Indicative benchmarks** for fluorescent and high intensity discharge products

1. Lamp efficacy and lamp life

2. Lamp mercury content

3. Ballast performance

4. Luminaire product information

Annex VI **Indicative benchmarks** for products to be installed as office lighting

1. Lamp benchmarks

1.1 Lamp performance

1.2 Product information for lamps

2. Light source control gear benchmarks

2.1 Light source control gear performance

2.2. Product information for light source control gear

3. Luminaire benchmarks

3.1 Luminaire performance

3.2. Product information for luminaires

Annex VII **Indicative benchmarks** for products to be installed as public street lighting

1. Lamp benchmarks
    1.1 Lamp performance
    1.2 Product information for lamps
2. Light source control gear benchmarks
    2.1 Light source control gear performance
    2.2. Product information for light source control gear
3. Luminaire benchmarks
    3.1 Luminaire performance
    3.2. Product information for luminaires

ANNEX I
General exemptions

1. THE FOLLOWING LAMPS SHALL BE EXEMPTED FROM THE PROVISIONS OF THIS REGULATION:

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,

c) lamps intended for use in other applications than general lighting and lamps incorporated into other products not providing a general lighting function,

d) lamps having:

- 6% or more of total radiation of the range 250-780 nm in the range of 250-400 nm,
- 11% or more of total radiation of the range 250-780 nm in the range of 630-780 nm,
- 5% or more of total radiation of the range 250-780 nm in the range of 640-700 nm, and
- the maximum of total radiation between 315 - 400 nm (UVA) or 280 - 315 nm (UVB),

e) double capped fluorescent lampshaving:

- a diameter of 7mm (T2) and less,
- a diameter of 16 mm (T5) and lamp power $P \leq 13W$ and $P > 80W$,
- a diameter of 38mm (T12), lamp cap G-13 Medium BiPin base, +/-5m (+magenta,- green) color compensating filter value limit (cc). CIE coordinates x=0.330 y=0.335 and x=0.415 y=0.377, and

– a diameter of 38mm (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 = 3200K with chromaticity coordinates x=0.415 y=0.377 and Tc = 5500K with chromaticity coordinates x=0.330 y=0.335,

f) metal halide lamps with Tc > 7000K,

g) metal halide lamps having a specific effective UV output > 2mW/kLm, and

h) metal halide lamps not having lamp cap E27, E40, PGZ12

2. THE FOLLOWING LUMINAIRES SHALL BE EXEMPTED:

a) Emergency lighting luminaires and emergency sign luminaires within the meaning of Council Directive 73/23/EEC[19]

b) Luminaires covered by the requirements of Directives 94/9/EC of the European Parliament and of the Council [20], Directive 1999/92/EC of the European Parliament and of the Council [21], Directive 2006/42/EC of the European Parliament and of the Council [22], Council Directive 93/42/EEC [23], Council Directive 88/378/EEC [24] and luminaires integrated into equipment covered by these requirements.

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19 Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits, OJ L 77, 26.3.1973, p. 29

20 Directive 94/9/EC of the European Parliament and of the Council of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres, OJ L 100, 19.4.1994, p. 1

21 Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres, OJ L 23, 28.1.2000, p. 57

22 Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast), OJ L 157, 09/06/2006 P. 0024 - 0086

23 Council Directive 93/42/EEC of 14 June 1993 concerning medical devices, OJ L 169, 12/07/1993 P. 0001 – 0043

24 Council Directive 88/378/EEC of 3 May 1988 on the approximation of the laws of the Member States concerning the safety of toys, Official Journal L 187, 16/07/1988 P. 0001 - 0013

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

1. TECHNICAL PARAMETERS FOR ECODESIGN REQUIREMENTS

For the purposes of compliance and verification of compliance with the requirements of this 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) "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;

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", 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) "Utilization 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 (P_{lamp}) and the ballast efficiency.

For ballasts for single and double capped fluorescent lamps, the EBb is calculated as follows:

When $P_{lamp} \leq 5$ W : $EBb_{FL} = 0.71$

When 5 W < P_{lamp} < 100 W : $EBb_{FL} = P_{lamp}/(2*sqrt(P_{lamp}/36)+38/36*P_{lamp} +1)$

When $P_{lamp} \geq 100$ W : $EBb_{FL} = 0.91$

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 stabilizing 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).

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 following rated luminous efficacies at 25°C.

In case the nominal wattages are different from those listed in Table 1, lamps must reach the luminous efficacy of the nearest equivalent in terms of wattage, except T8 lamps above 50W, which must reach a luminous efficacy of 83 lm/W. If the lamp wattage is at equal distance from the two nearest wattages in the table, it shall conform to the higher efficacy of the two.

Table 1

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 lamp wattage is at equal distance from two wattages in the table, it shall conform to the higher efficacy of the two.

Table 2

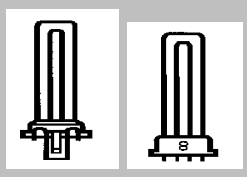
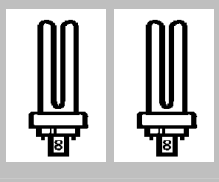
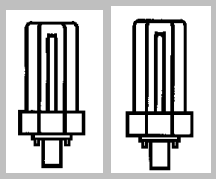
Small single parallel tube, lamp cap G23 (2 pin) or 2G7 (4 pin) 		**Double parallel tubes, lamp cap G24d (2 pin) or G24q (4 pin)** 		**Triple parallel tubes, lamp cap GX24d (2 pin) or GX24q (4 pin)** 	
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value
5	50	10	60	13	69
7	57	13	69	18	67
9	67	18	67	26	66
11	82	26	66	32	75
				42	76
				57	75
				70	74

Table 3

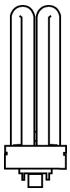
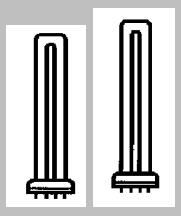
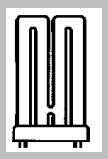
Four parallel tubes, lamp cap GX24q (4 pin) 		**Long single parallel tube, lamp cap 2G11 (4 pin)** 		**4 legs in one plane, lamp cap 2G10 (4 pin)** 	
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value
57	75	18	61	18	67
70	74	24	71	24	75
		36	78	34	82
				36	81
				40	83
				55	82
				80	75

Table 4

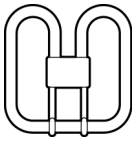
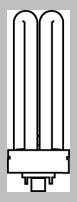
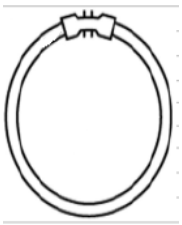
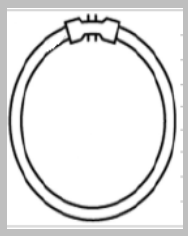
Single flat plane tube, lamp cap GR8 (2 pin), GR10q (4 pin) or GRY10q3 (4 pin) 		**Four or three parallel T5 tubes, lamp cap 2G8 (4 pin)** 	
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value
10	65	60	67
16	66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

Table 5

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

Corrections applicable to both single and double capped fluorescent lamps

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

Table 6

Lamp parameter	**Authorized deduction from luminous efficacy at 25°C**
Tc ≥ 5000K	- 10%
95 > Ra > 90	- 20%
Ra > 95	- 30%
Second lamp envelope	- 10%

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.

High intensity discharge lamps shall have at least the following rated luminous efficacies:

Table 7

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 ≤ 400	75

Lamps with Tc ≥ 5000K or equipped with a second lamp envelope have to fulfil 90% of the applicable lamp efficacy requirements.

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.

Double capped fluorescent 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 reach the minimum efficacy of the T8 lamp which is their nearest equivalent with regards to wattage.

The corrections defined for the first stage (Table 6) shall continue to apply.

High-intensity discharge lamps

Lamps with Tc ≥ 5000K or equipped with a second lamp envelope shall fulfil 90% of the applicable lamp efficacy requirements.

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

Table 8

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

These requirements 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 following rated luminous efficacies:

Table 9

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

C. Third stage requirements

Eight years after the entry into force of this Regulation:

Fluorescent lamps without integrated ballast shall be designed to operate with ballasts of energy efficiency class at least A2 according to Annex III.2.2.

Metal halide lamps shall have at least the following rated luminous efficacies:

Table 10

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 ≥ 5000K or with a second lamp envelope shall fulfil 90% of the applicable lamp efficacy requirements.

High-pressure sodium and metal halide lamps above 4000 lm luminous flux shall be clear lamps within the meaning of Annex II.

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 (CRI) 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 (CRI) of at least 80. They shall have the following lamp lumen maintenance factors:

Table 11

Lamp lumen maintenance factor	**Burning hours**			
Lamp types	**2000**	**4000**	**8000**	**16000**
Double-Capped Fluorescent lamps operating on non-high frequency ballasts	0.95	0.92	0.90	-
Double-Capped Fluorescent lamps on high frequency ballast with warmstart	0.97	0.95	0.92	0.90
Single-Capped Fluorescent lamps operating on non-high frequency ballasts	0.95	0.90	0.80	-
Single-Capped Fluorescent lamps on high frequency ballast with warmstart	0.97	0.90	0.80	-

Fluorescent lamps without integrated ballast shall have the following lamp survival factors:

Table 12

Lamp survival factor	**Burning hours**			
Lamp types	**2000**	**4000**	**8000**	**16000**
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
Single-Capped Fluorescent lamps operating on non-high frequency ballasts	0.95	0.92	0.50	-
Single-Capped Fluorescent lamps on high frequency ballast with warmstart	0.95	0.90	0.87	-

High pressure sodium lamps shall have the following lamp lumen maintenance factors and lamp survival factors:

Table 13

Burning hours	**Lamp lumen maintenance factor**	**Lamp survival factor**
12000 h ($P \leq 75$ W)	> 0.80	> 0.90
16000 h ($P > 75$ W)	> 0.85	> 0.90

C. Third stage requirements

Eight years after the entry into force of this Regulation:

Metal halide lamps shall have the following lamp lumen maintenance factors and lamp survival factors:

Table 14

Burning Hours	**Lamp lumen maintenance factor**	**Lamp survival factor**
12000	> 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 2000h, 4000 h, 6000 h, 8000h, 12000 h, 16000 h and 20000 h (up to 8000h 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 2000h, 4000 h, 6000h, 8000h, 12000 h, 16000 h and 20000 h (up to 8000h 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) Rated lamp mercury content rounded off to 0,5 mg

g) Colour Rendering Index (Ra) of the lamp

h) Colour temperature of the lamp

i) Ambient temperature at which the lamp was designed to maximize its luminous flux. If the lamp does not fulfill at least 90% of the respective luminous efficacy requirement in Annex III1.1 at an ambient temperature of 25°C (100% for T5 lamps), it shall be stated that the lamp is not suitable for indoor use at standard room temperatures.

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 16 in Annex III.2.2, A3 for the ballasts covered by table 17, and A1 for dimmable ballasts covered by table 18.

At the dimming position corresponding to 25% of the lumen output of the operated lamp, the input power (P_{in}) of the lamp-ballast circuit shall not exceed:

$$P_{in} < 50\% * P_{Lrated} / \eta_{ballast}$$

Where P_{Lrated} is the rated lamp power and $\eta_{ballast}$ 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 excluded 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:

Table 15

Nominal lamp wattage (P) **W**	**Minimum ballast efficiency ($\eta_{ballast}$)** **%**
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 excluded 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 :

$\eta ballast \geq EBbFL$

where EBbFL is defined in Annex II.3.g.

Ballasts for high intensity discharge lamps below or equal to 100 Watt rated lamp power shall have an efficiency of at least 87 % at full power and for lamps above 100W rated power at least 94 %, except if the ballasts for lamps above 100W rated power are dimmable in at least five steps down to 50 % lamp power, in which case their efficiency at full power shall be at least 89%.

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.

The following table 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).

Table 16

LAMP DATA					BALLAST EFFICIENCY (Plamp / Pinput)				
					Non-dimmable				
Lamp type	Nominal Wattage	ILCOS CODE	Rated/typical wattage		A2 BAT	A2	A3	B1	B2
			50Hz	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=1 FSQ-26-I-G24d=1	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 / DDE	16	FSS-16-E-GR10q FSS-16-I-GR10q FSS-10-L/P/H-GR10q	16	15	87,0 %	83,3 %	75,0 %	72,4 %	66,1 %
TC-DD / DDE	21	FSS-21-E-GR10q FSS-21-I-GR10q FSS-21-L/P/H-GR10q	21	19	89,4 %	86,4 %	79,2 %	73,9 %	68,8 %
TC-DD / DDE	28	FSS-28-E-GR10q FSS-28-I-GR10q FSS-28-L/P/H-GR10q	28	26	89,7 %	86,7 %	81,3 %	78,2 %	73,9 %
TC-DD / DDE	38	FSS-38-E-GR10q FSS-38-L/P/H-GR10q	38,5	36	92,3 %	90,0 %	85,7 %	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	85,9 %	82,0 %	73,3 %		
T5-E	21	FDH-21-G5-L/P-16/850		20,7	90,2 %	87,3 %	80,5 %		
T5-E	24	FDH-24-G5-L/P-16/550		22,5	90,9 %	88,2 %	81,8 %		
T5-E	28	FDH-28-G5-L/P-16/1150		27,8	90,3 %	87,4 %	82,2 %		

T5-E	**35**	FDH-35-G5-L/P-16/1450		**34,7**	**92,0 %**	**89,7 %**	**83,2 %**		
T5-E	**39**	FDH-39-G5-L/P-16/850		**38**	**92,7 %**	**90,5 %**	**84,4 %**		
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**	**92,3 %**	**90,0 %**	**85,7 %**		
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-2GX24q=3		**32**	**91,4 %**	**88,9 %**	**82,1 %**		
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-GR10q		**55**	**92,4 %**	**90,2 %**	**84,6 %**		

In addition, non-dimmable ballasts not included in table 16 shall be assigned the following EEI depending on their efficiency:

Table 17

$\eta_{ballast}$	**Energy Efficiency Index**
$\geq 0{,}94 * EBb_{FL}$	A3
$\geq EBb_{FL}$	A2
$\geq 1\text{-}0{,}75*(1\text{-}EBb_{FL})$	A2 BAT

Where EBb_{FL} is defined in Annex II.3.g.

Futhermore, dimmable fluorescent lamp ballasts receive the following EEI classes according to the class into which the ballast would fall when it is operated at the 100% lumen output.

Table 18

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 and any additional sensors are disconnected. If they cannot be disconnected, their power shall be measured and excluded 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.

Luminaires for high intensity discharge lamps with total lamp lumen above 4000 lumen shall be designed for clear lamps within the meaning of Annex II.

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 and any additional sensors are disconnected. If they cannot be disconnected, their power shall be measured and excluded 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 and for high intensity discharge lamps with total lamp lumen above 2000 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 sold 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 sold 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 sold 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 high intensity discharge lamps. In addition, luminaires for high intensity discharge lamps with total lamp lumen above 4000 lumen shall indicate that they are designed for clear 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.

For lamps:

Member State authorities shall test a sample batch of minimum twenty lamps of the same model from the same manufacturer, randomly selected from at least four different points of sale.

The batch shall be considered to comply with the provisions set out in Annex III Part 1 as applicable, of 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, of 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

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 19

	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**
12000	>0,80	>0,80

High-pressure sodium lamps (clear and frosted) :

Table 20

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**
16000	>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.

High intensity discharge lamp ballasts with ηballast = 0,9 that are continuously dimmable down to 40 % lamp power (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 to be installed as office lighting

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 following lamp lumen maintenance factors (LLMF) and lamp survival factors (LSF):

Table 21

Burning hours	2000	4000	8000	16000
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 full power.

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 Watt lamp power) and else 90 % and are dimmable if the sum of lamp powers operated on the same ballast is above 50 Watt.

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

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 22

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 x LMF instead of simply the LMF.

ANNEX VII
Indicative benchmarks for products to be installed as public street lighting

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 following lamp lumen maintenance factors (LLMF) and lamp survival factors (LSF):

Table 23

Burning hours	2000	4000	8000	16000
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 full power when the rated lamp lumen output is above 9000 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 Watt 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 Watt 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 24

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	
12000 lm ≤ light source	**5%**
8500 lm ≤ light source < 12000 lm	**10%**
3300 lm ≤ light source < 8500 lm	**15%**
light source < 3300 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 for.

If they are luminaires for fluorescent or HID 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) Utilization 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 optimizing the Utilization Factor.

d) Additional installation recommendations to minimize obtrusive light (if not conflicting with UF optimization 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 25

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 x LMF instead of simply the LMF.