

ENERGY EFFICIENCY REQUIREMENTS, LABELLING AND ECODESIGN OF LIGHTING PRODUCTS: EUROPEAN EXPERIENCE

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In the future the unit of currency will be the kilowatt-hour
Arthur Clark

ABSTRACT

The main European laws regulating the energy efficiency, labelling and eco-design of lighting products are considered in the article.

Keywords: energy efficiency, labelling, eco-design, directive of the European Union, regulation of the European Union, lighting products, classes of energy efficiency, eco-labelling

The main objectives of the European Union's (EU) uniform energy policy are the transition towards renewable energy sources, the increase in energy efficiency, the decrease of greenhouse gas emissions, the creation of a uniform energy market and support of the development of competition within it.

In December 2008, an EU summit affirmed the program on abatement of climate change for 2013–2020, developing the 20–20–20 goals. This plan includes a 20 % growth target for energy renewable sources in the overall power consumption landscape by 2020, a 20 % reduction in polluting greenhouse gas emissions compared to 1990 levels and a general reduction in energy consumption of 20 %. The 20–20–20 plan aims to make EU economies energy efficient and reduce fuel consumption.

In January 2014, the EU began the implementation of a new programme of work, focusing on scientific and technological innovation, called

“Horizon 2020”, which combines framework programmes of the EU on scientific research and development, on competitiveness and innovation. Priority is given to high efficiency eco-, nano-, bio- and info-technologies aimed at solving social and environmental problems. These include safe, clean and efficient power generation, climate change, efficient use of resources and raw materials.

The EU applies an integrated approach to building a legislative base in the energy efficiency, labelling and eco-design fields. The main legislative instruments of the EU are Directives and regulations issued by the European Parliament and EU Council, which regulate product standards for all producers in EU member states. Adopted Directives and regulations are increasingly targeting electronic devices, including lighting products. In this context, it is impossible to implement an effective energy saving policy in Russia without committing to the standards set by EU Directives and regulations.

An important factor, which can assist consumers in correctly choosing high-efficiency lighting products out of the existing product line, is energy efficiency labelling. Labelling influences a product's competitiveness, because the label also indicates quality and reliability.

Over the last few years, the European Parliament has introduced some additions and changes into the adopted directives on energy efficiency, labelling and eco-design of household electrical appliances.

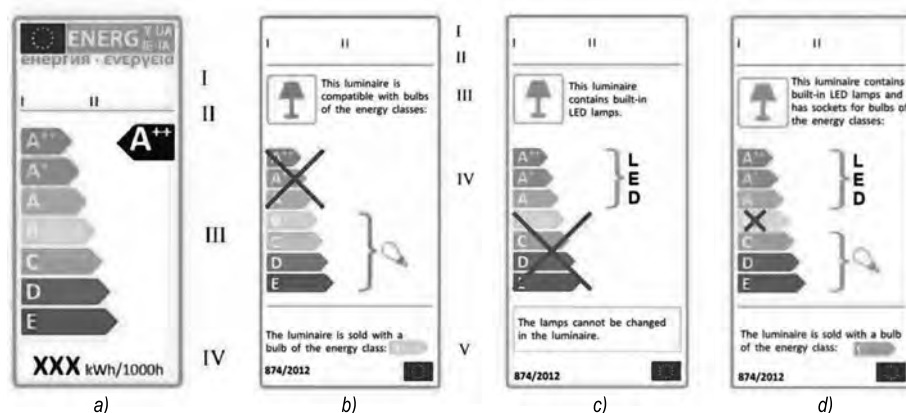


Fig. 1. Examples of labels [3]. a – for electric lamps; b – for luminaires compatible with lamps of power consumption classes B, C, D, E equipped with energy efficiency lamps of class E; c – for luminaires compatible with built-in non-interchangeable LED lamps; d – for luminaires containing built-in LED lamps and sockets for replaceable lamps of power consumption classes A⁺⁺, A⁺, A, C, D, E equipped with power consumption lamps of class N

The new Energy Labelling Directive 2010/30/EU [1], which replaces directive 92/75/EEC [2] from June 18, 2010 on labelling power-consuming products, with an energy efficiency label and replaces EU regulation 874/2012 on labelling electric lamps and luminaires, with an energy efficiency label [3] supplementing directive 2010/30/EU, establishes that energy efficiency labels are necessary for all electrical household appliances on the EU domestic market. According to these documents, energy efficiency information on the labels depends on the product's energy efficiency level: from A to G. Relevant information on the energy efficiency labels of household lamps sold in European shops helps buyers choose the products.

According to EU regulation #874/2012 on labelling, the energy efficiency label of electric lamps and luminaires establishes two more energy efficiency classes for products, which meet the highest market standards for energy parameters: A⁺ and A⁺⁺. If luminaires have the highest class of energy efficiency (A⁺ or A⁺⁺), then the lowest classes (E, F, G) for such luminaires should be excluded from the label by means of their lining through in the label. And otherwise, in case luminaires cannot have energy efficiency class higher than class B, then highest classes (A⁺ and A⁺⁺) are lining through in the label¹.

Fig. 1 presents examples of labels [3] for electric lamps and luminaires, which should be presented at point of sale.

EU regulation 2015/1428/EU [4] establishes a requirement, based on which luminaires placed on the

EU market should be compatible with high-efficiency lamps of class A⁺. After adoption of regulation 2015/1428/EU and amendments to EU regulation 1194/2012 [5], it can be expected that further EU directives and regulations will be adopted, which will determine a list of indices for energy efficiency classes A⁺ and A⁺⁺ for high-efficiency light sources, including LED products, as well as developing methods of determination of energy efficiency classes for such light sources.

In 2005, the EU Commission adopted directive 2005/32/EU [6] and the correspondent regulations #244/2009 [7] and #245/2009 [8] establishing requirements for environmentally friendly power-consuming products. According to this directive, the manufacturers should undertake measures for energy consumption reduction and to decrease other negative impacts on environment at all stages of the product's service life. This approach was named ecodesign. Ecodesign is a new concept in EU countries, which aims to decrease the energy consumption of household electrical appliances. Ecodesign establishes requirements for the structure and operating parameters of electrical household appliances, in order to avoid harmful impacts on environment (limitation of application and reduction of toxic substances in production) and to be energy efficient. According to directive #2005/32/EU, a manufacturer must include information concerning environmental friendliness of the product and its level of energy efficiency on the packaging, which allows consumers to compare products before purchase. Electrical household appliances, which includes

¹ As for the Russian Federation, in 2011, a project of the Engineering regulation of the Customs union was developed "About informing consumers on energy efficiency of electric power-consuming devices" (<http://www.eurasiancommission.org/ru/act/txnreg/deptexreg/tr/Pages/InformEnergy.aspx>) but it has not been adopted yet. In the territory of the RF, GOST P 54993–2012 "Household Lamps. Indices of energy efficiency" is valid, within which classes A⁺ and A⁺⁺ are not provided for. – Editor's note.

Table 1. Luminous flux of energy efficient lamps and power of the equivalent incandescent lamps [7]

Luminous flux, lm			Power of equivalent incandescent lamp, W
Compact fluorescent lamps	Halogen incandescent lamps	Light-emitting diode and other lamps	
125	119	136	15
229	217	249	25
432	410	470	40
741	702	806	60
970	920	1 055	75
1 398	1 326	1 521	100
2 253	2 137	2 452	150
3 172	3 009	3 452	200

lighting products, impact the environment during their service life. The impacts include raw materials and natural resources used in their production, packaging, transportation, sale, operation and utilisation. Besides, ecodesign ensures reducing energy resource consumption, which is an important component of the EU policy. And it should be noted that in [7] for the first time, a requirement was officially formulated, according to which “If equivalence with an incandescent lamp is claimed on the packaging, the claimed equivalent incandescent lamp power (rounded to 1 W) shall be that corresponding in Table 6 to the luminous flux of the lamp contained in the packaging. The intermediate values of both the luminous flux and the claimed incandescent lamp power (rounded to 1 W) shall be calculated by linear interpolation between the two adjacent values”.

To expand the scope of directive #2005/32/EU, directive EU2009/125/EC [9] concerning requirements for ecodesign of directional light luminaires, LED lamps and the accompanying equipment was adopted in 2009. According to the mentioned directive, for each service life stage of a product, ecological aspects should be estimated including the following parameters: expected consumption of raw materials and other material as well as resources and energy; expected lifecycle emissions into the atmosphere, water, or soil; pollution including noise, vibration, radiation, electromagnetic fields; potential for material recycling and utilisation. In Directive 2009/125/EU ecodesign requirements cover the full extent of lighting products' design (mercury concentration and emission, carbon dioxide emission into atmosphere, electromagnetic compatibility, etc.). And the existing requirements for pro-

duct energy efficiency labelling, as well as a voluntary deposition of the ecological label are applied along with the requirements established by ecodesign directives.

A voluntary ecolabelling of light sources is established by EU decision #2002/747/EU. Manufacturers can display the EU Flower (Fig. 2) awarded to products most the favourable environmental credentials, if they meet requirements [10] on ecolabelling. To obtain the right to eco-labelling, products must meet certain conditions:

- The product should correspond to a high class of energy efficiency, at least to class A;
- Use of toxic substances should be limited in the product. For example, mercury concentration in discharge lamps should not exceed values stipulated by directive 2002/95/EU [11].

Furthermore, certain operational parameter requirements must be met, such as lifetime, luminous flux, as well as other parameters determining lamp quality.

The European experience shows that energy efficiency requirements for lighting products change significantly with time, becoming more stringent,



Fig. 2. EU eco label

which is confirmed by continuing adoption of new directives and regulations, as well as amendments made to current regulatory documents.

Continuously monitoring the directives and regulations which exist in the EU will allow Russian lighting product manufacture to consider all of the requirements of the European market, including energy efficiency, labelling and ecodesign, which will eventually facilitate an increase in lighting product export.

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