



OUTER TEMPERATURE EFFECTON OF LED LAMPS WORKING CHARACTERISTICS

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Abstract

Electricity production in the state in 2017 decreased by 10.2% compared to the previous year to 163.3 billion kWh. At the same time, the saving of electric energy is of interest not only to the state and business owners, but also to the representatives of ordinary households. Every year the issue of energy saving and energy efficiency is becoming more and more relevant. There are a number of reasons for this, among which one can distinguish: shortage of energy resources in Ukraine; reduction of natural resources; rising prices for energy imports; annual increase in electricity consumption. Nuclear power plants, which today produce almost 60%, in 2017 reduced electricity production by 0.9% compared to the previous year to 87.6 billion kilowatt-hours. So the problem of energy conservation has a global scale. Up to 20% of the total electricity consumption in the industry falls on electric lighting. One of the ways to increase energy efficiency is to modernize the lighting. A few years ago, the introduction of LED-type lamps was too expensive, so it's not effective. Therefore, we decided to experiment experimentally with the introduction of different types of lamps, and to compare their economic expediency in time. But the situation in the market is changing, the cost of LEDs is reduced, as well as the irelectricity consumption.

Key words:

LED lamps, energy saving lamps, LED lamps composition.

Introduction

The problem of energy conservation has a global scale. Up to 20% of the total electricity consumption in the industry falls on electric lighting. One of the ways to increase energy efficiency is to modernize the lighting.

Our experiments indicate that many LEDs are poorly-matched, but not always consistent with the characteristics of manufacturers.

Also, at the moment, the issue of the influence of ambient temperature on the operation of LED lamps and their lighting characteristics has not been sufficiently studied.

Formulation of problem

Having analyzed the available modern light sources, the main generalized characteristics of light sources.

After analyzing the above information and taking

into account the problems of energy saving, it can be argued that one of the effective ways to reduce consumption (EC) for lighting is the replacement of incandescent lamps (IL) for compact fluorescent lamps (CFLs), whose light output is 4-5 times higher than in LR (Hoshko, 2014; Goshko *et al.* 2015a; Goshko *et al.* 2015b) , and light-emitting diode (LED) lamps with light output of 5-8 times higher than LR, both in the illumination of the production complex, (Goshko, 2015; Goshko, 2016; Goshko *et al.* 2016) and in the housing and communal services. Street lighting is considered more economically - advantageous when using sodium lamps of high pressure with light output of 100-130 lm/W (Hoshko, 2017).

Purpose of research

The purpose of the study is to investigate the effect of ambient temperature on the operation of LED lamps and their lighting characteristics.

Research results and discussion

When choosing LED lamps before we bought them, we were only observing one parameter, all LEDs should have only one power, and for a more illustrative example, they would purchase for their experiments about 10 pieces in a different price category.

Actually all parameters were respected. The largest election of available bulbs for the E-27 cartridge was

10-inch representatives of all existing brands.

After completing the research on each of their preventatives of our lamps formed dependencies of various parameters to better compare them amongst themselves. Their list, specifications and price are given in Table 1.

An experiment was conducted to change the lighting, depending on the ambient temperature. The data is included in the graph in Figure 1.

Table 1. Characteristics of lamps, specified by manufacturers

Title	Voltage, V	P, W	Light flux	Guarantee	Manufacturing Country	Price
Svetkomplekt	165-265	10	840	3 years 30 000 hr	China	56.88 hrn
EUROLAMP	175-250	10	1000	10 years 50 000 hr	Germany	59.88 hrn
PHILIPS	220-240	10	900	3 years 20 000 hr.	China	53.94 hrn
Expert10 (Horoz)	220-240	10	900	2 years 25 000 hr.	China	72 hrn
Lemanso	175-265	10	1020	2 years -	China	45 hrn
Estares	175-265	10	820	2 years 30 000 hr.	China	54.96 hrn
Videx	175-250	10	900			
Maxus	175-250	10	950	2 years 40 000 hr.	China	50 hrn
Gauss	150-265	10	920	3 years 30 000hr.	China	61.98 hrn
Jazzway	230	10	800	3 years 35 000 hr.	China	64.92 hrn

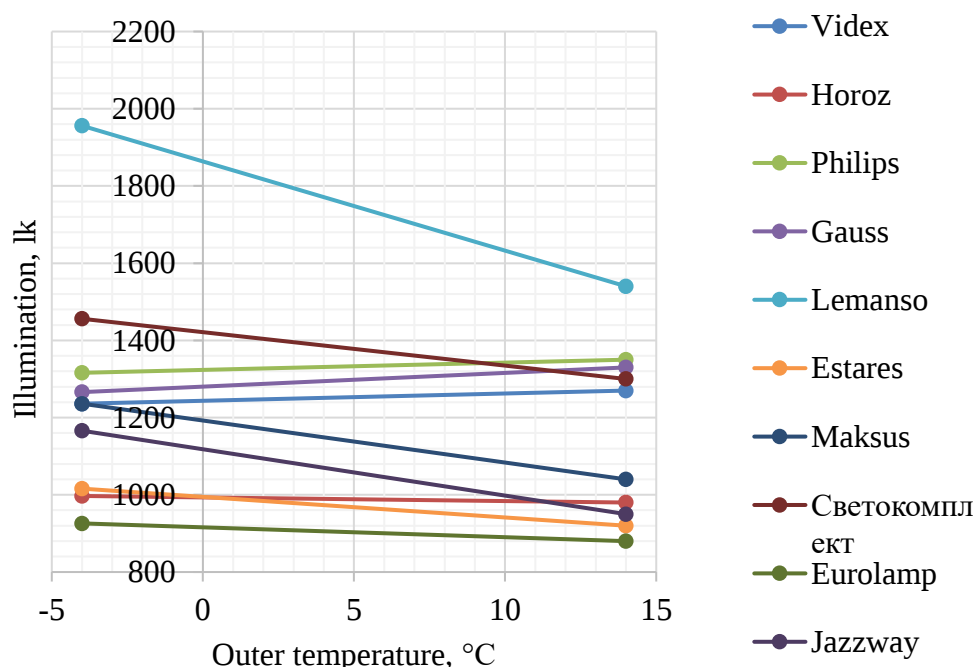


Figure 1. Illumination change due to the outer temperature.

The change in illumination appears, and increases at a lower temperature. It is more rational to use Leman so at low temperatures, the power consumed will not

change and the illumination will increase, in our case by 31%. On an analytic light bulb above the following representatives of Maxus, Svetkomplekt, Jazz way and

Estares, and I have such behavior, but in a small erratio. From the consumer's point of view, the best option for this parameter in any case has not changed, or did it in significantly, the following representatives cope perfectly with the following representatives, Philips, Gauss, Videx, Horoz and Eurolamp.

We also decided to determine what the actual

power of the lamps in the operating voltage range and how it corresponds to the declared capacity of the manufacturer. To do this, a series of experiments was conducted, the results of which are summarized below.

In Figure 2 graphically depicts power comparisons in the operating range.

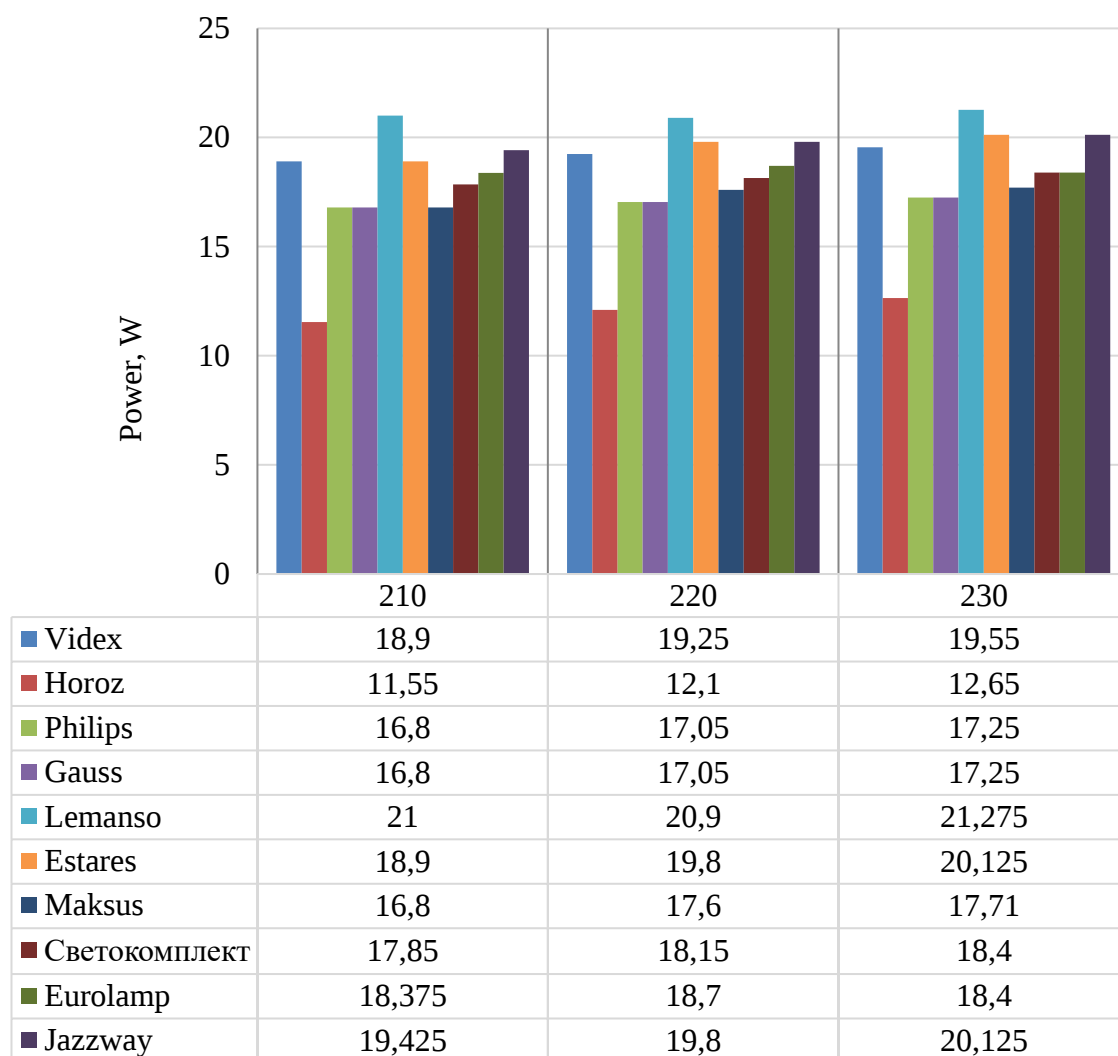


Figure 2. Comparison of the operating range power.

In the experiments outlined above, it is vividly demonstrated how manufacturers establish low-quality FDI or light-colored elements, which, in their turn, give away the characteristics that are represented by manufacturers. Only 1 in 10 lamps selected by us approximately correspond to the given parameters.

Conclusions

The change in illumination appears, and increases at a lower temperature. It is more rational to use Leman so at low temperatures, the power consumed will not change and the illumination will increase, in our case by 31%. On an analogous light bulb above the following representatives of Maxus, Svetkomplekt, Jazzway and Estares, and I have such behavior, but in a small erratio. From the consumer's point of view, the

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