

Save Electricity While Complying with Lighting Regulations

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Annotation: Electric lighting - along with other devices for technical equipment of industrial premises, creates comfortable conditions for productive work, the level of illumination significantly affects labor productivity. Therefore, the task of saving electricity in lighting installations should be understood in such a way as to ensure optimal illumination of industrial premises and workplaces and high-quality lighting, and create an environment for the most productive work of workers with a minimum cost of electricity through the correct design and operation of lighting installations.

Key words: Illumination, electricity consumption, luminous flux, natural lighting, artificial lighting.

Introduction

Electricity consumption for lighting industrial enterprises is constantly growing and amounts to an average of 5-10% of their total consumption across industries. For individual industries, the consumption of electricity for lighting installations varies significantly: in metallurgical enterprises - about 5%, in mechanical engineering - 10%, in light industry - and on average 15%. At some light industry enterprises, the share of electricity consumption for lighting installations exceeds 30%.

For existing lighting installations, the actual illumination depends on the actual illumination, the area of the room; the number of luminaires, the number of lamps in each luminaire, the luminous flux of each lamp, the utilization factor of the luminous flux,

The luminous flux of the lamp depends on the type and power of the lamp, the voltage on the lamp and the degree of its wear. The utilization factor of the luminous flux depends on the following factors: efficiency and the shape of the luminous intensity distribution curve of the luminaires, the suspension height of the luminaires, increasing with its decrease, the area of the room.

Saving energy in the design of lighting installations

Saving energy in the design of lighting installations Building codes provide recommendations for the rational colors of finishing walls, ceilings, floors, trusses, beams, as well as technological equipment of workshops of industrial enterprises in order to improve the lighting of industrial premises and working conditions.

When designing natural and artificial lighting in industrial buildings, an increase in the illumination of workplaces due to reflected light from the surfaces of interiors, the decoration of which is carried out in accordance with the recommendations of building codes, should be taken into account.

Electricity consumption for electric lighting depends on the number and power of lamps, power losses in ballasts (ballasts) and in the lighting network, and on - the number of hours of use of the power of lighting installations for a given period (for example, a year). The duration of the lamp burning depends to a large extent on the rational design and the maximum use of natural light.

A rational arrangement of natural lighting in the production area and the creation of sufficient illumination of the working surfaces required by the technological process of production should be provided for in the design of the building. Sometimes this is forgotten when applying projects of buildings intended for industries with lower requirements for the level of illumination. Insufficient natural illumination in such buildings is lower than acceptable for this type of production, especially on cloudy winter days, leads to the need to use electric lighting during the day. The efficiency and duration of natural light is dependent on the condition of the glazing, and regular glass cleaning is required to keep it clean. The frequency of cleaning depends on the degree of air pollution in the production area and outside air.

The rules for the technical operation of electrical installations (PTE) require at least two glass cleanings per year with minimal dust content and at least four with significant emissions of dust, smoke and soot.

Cleaning methods depend on the persistence of the dirt: for easily removable dust and dirt, it is sufficient to wash the glasses with soapy water and water, followed by wiping. For persistent oily contamination, oil soot, special compounds must be used for cleaning.

The efficiency of regular cleaning of the glazing is very high: the duration of lamp burning during two-shift operation of workshops is reduced in winter by at least 15%, and in summer by 90%.

Economical consumption of electricity for lighting installations largely depends on the correct choice of light sources and luminaires, as well as the rational operation of lighting installations.

When choosing luminaires, the height of the premises, their dimensions, environmental conditions, lighting technical data of the luminaires, their energy efficiency, the required illumination, the quality of lighting, etc. are taken into account. Reflectors are more important for the efficiency of luminaires. Electric lighting control

Electric lighting control For economical consumption of electricity in electric lighting installations, a rational lighting control system must be provided. A correctly constructed lighting control scheme helps to reduce the duration of lamp burning and, for this purpose, provides for the ability to turn on and off individual lamps, their groups, premises, buildings, and the entire enterprise.

In low and small industrial and auxiliary premises (with a height of up to 4-5 m), it is possible to use switches for one or two lamps or a small group of lamps.

For large workshops, it is possible to use remote contactor control of the lighting of the entire workshop and a limited number of places - one or two, which will facilitate lighting control and allow more economical use of electricity.

The lighting control panel is located in the premises of the duty personnel.

The management of outdoor lighting with its division into parts (lighting of roads and driveways, security lighting, lighting of open places of work, lighting of large areas and open warehouses) should be as centralized as possible throughout the enterprise. Usually, the lighting control of the entire enterprise is also centralized, that is, the lighting of all buildings and outdoor lighting. Telephone and telecontrol cables are used for remote lighting control. The lighting control of the entire enterprise, as a rule, is concentrated on the duty station of the energy economy of the enterprise.

Centralization of lighting control of the entire enterprise pursues the goal of choosing the most rational time for switching on and off lighting, combining it with the level of natural illumination, with the beginning, interruptions and end of work in the workshops of the enterprise.

In practice, various schemes are used to automate lighting control. Most often, outdoor lighting control is automated. For automatic control of lighting, photocells or photoresistors are used, which serve as sensors for automatic controls. The sensors are adjusted to a certain minimum level of natural light to turn off the lighting at dawn and turn it on at dusk.

Saving energy during the operation of lighting installations

Saving energy in the operation of lighting installations Correct operation and repair of lighting installations is of the utmost importance for saving energy. The service of the chief power engineer should draw up plans and schedules for inspections, cleanings, lamp replacements and scheduled preventive maintenance of lighting installations and monitor their implementation.

An extensive group of energy saving measures is associated with the correct operation and repair of lighting installations. The most important of them is the development and implementation of methods and devices for timely cleaning of lamps and replacement of worn-out lamps, which are extremely important for the rational consumption of electricity for lighting.

Reducing the duration of the lamp burning gives direct energy savings, to this, measures are aimed at maximizing the use of natural lighting, the correct lighting control device, the use of automatic and programmed lighting control.

The rules for the technical operation of electrical installations (PTE) stipulate that the cleaning of lamps and lamps is carried out in a time frame determined by the person responsible for the electrical system, depending on local conditions. In the Electrical Installation Rules (PUE) and departmental instructions I have instructions on the recommended frequency of cleaning the lamps. The loss of luminous flux increases dramatically from contamination of the lamps.

To ensure economical operation, the used luminaires should allow easy removal of all contaminated parts - protective glasses, reflectors, diffusers, cartridges for cleaning them in stationary workshop conditions.

The processes of replacing removable parts of lighting fixtures with clean ones and cleaning dirty parts and workshops using special detergents and mechanization means should be worked out in detail. In operation, there must be an exchange fund of at least 5 - 10% of removable parts located in lighting installations. One of the main reasons for the unsatisfactory operation of lamps should be eliminated - the difficulty of access to them. This is especially true for workshops with a height of more than 4 m, where these issues are acute. The most convenient for servicing lighting installations are stationary devices, including: technical floors (arranged for various types of communications, ventilation, air conditioning), platforms, special electrical bridges.

Reference

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