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LED-LIGHNING TECHNOLOGIES

An LED is a semiconductor device that emits light when an electric current and a certain chemical reaction are passed through it. The first LEDs appeared in 1962, emitting only low-intensity infrared light and were used as indicator lamps in expensive laboratory or electronic test equipment. Later developments created LEDs of different colors and expanded their use, and the advent of white LEDs made the latter suitable for indoor and outdoor lighting. Today, almost all modern

technology uses LEDs of one type or another. They can be found in remote control circuits for consumer electronics, medical devices, calculators, digital watches, kettles, coffee grinders, TVs, refrigerators, washing machines, radios, flashlights, computers, smartphones, and cars.

A light-emitting diode (LED) works on the basis of the electroluminescence effect. The basic principle is that when an electric current passes through a semiconductor crystal, the electrons and holes formed by the admittance recombine and emit photons of light. This process creates visible light that has a specific color depending on the semiconductor material used. Thus, LEDs generate light by directly converting electrical energy into light without significant energy loss to heat, making them energy-efficient and long-lasting light sources.

Let's look at the advantages and disadvantages of LED bulbs. The most important advantage of LEDs is their energy efficiency and economy. The energy efficiency or light output of a light source is the ratio of energy consumption to light output. The less energy a lamp consumes and the more light it produces, the more energy efficient it is. In addition to energy efficiency, LEDs provide maximum durability compared to other solutions. For example, the service life of an LED lamp is up to 50,000 hours, which is equivalent to 11 years of operation at 12 hours of work per day. LED lamps last even longer - up to 80 and even 100 thousand hours, which is more than 20 years without periodic lamp replacement. These figures are significantly higher than the service life of other products. LED lamps and matrices light up almost instantly (in microseconds) and reach their maximum light output immediately after switching on. They are not afraid of frequent switching on and off, unlike incandescent and fluorescent lamps, which fail faster when switched frequently, or high-intensity discharge lamps that take time to warm up, cool down and restart.

Since LED lamps do not contain mercury, they do not pose the same risk to human health and the environment as traditional mercury fluorescent lamps. Mercury can be hazardous to human health and ecosystems, especially if the lamp is broken or improperly disposed of. In addition, the efficiency of LED lighting helps to reduce electricity consumption compared to other light sources. Since electricity is generated from a variety of sources, such as coal, oil, or gas, reducing electricity consumption helps reduce greenhouse gas emissions and other harmful substances into the environment.

However, even the most high-tech devices usually have certain drawbacks, and LEDs are no exception. The high cost of LED lamps and lamps is traditionally considered one of the first. Of course, if compared to incandescent lamps and energy-saving lamps, the cost of LED devices will indeed be higher, but it has long been proven that the long service life, lack of maintenance costs and economical electricity consumption ensure a quick payback of the products. Among other disadvantages, we can note the dependence of the durability of the lamp on the

quality of manufacture, high requirements for the quality of heat dissipation, and sensitivity to voltage.

LED solutions have a wide range of color temperatures (from warm to cold), have a high color index, allow you to individually select the color of lighting, taking into account the characteristics of the interior or exterior, and adjust the brightness and temperature of the light, choosing a more comfortable glow in accordance with the functionality of the room or place of application.

LEDs are a modern and promising light source that is already widely used in various industries. They are characterized by high energy efficiency, durability, low heat generation, and low emissions. LEDs can also be easily controlled and adapted to different lighting needs, making them an ideal choice for home, commercial, and industrial use. Thanks to ongoing technology improvements, LEDs continue to become even more efficient, safe, and affordable for everyone.