

## Methods and potential of energy saving lighting

### ● To choose quality light source

To choose light source scientifically is the first priority of energy saving. Luminous efficiency of energy-saving light source is higher, making more luminous flux (Lm) power-per-watt (W), Luminous efficiency of incandescent bulbs normally 7 ~ 20Lm / W, their life is generally 1000h, only some specific models can reach 2000h; single-ended compact fluorescent lamps (commonly known as energy-saving lamps) Its luminous flux is generally 50Lm / W, so using a 9W life in 3000 ~ 5000h energy-saving lamps can replace 40W incandescent bulbs; double-ended straight tube fluorescent lamp T12 type flux of 55 Lm / W, life expectancy of 3000 ~ 5000h, and now the T5 model can reach 90 ~ 110 Lm / W, life expectancy up to 8000 ~ 10000h. Therefore, T12, T10 or T8 fluorescent lamp types should be eliminated, not only can save about 50% of the electricity, but also to improve the lighting, color rendering. In addition to these light sources, there are high-strength gas discharge lamp, such as high-pressure sodium lamp, metal halide lamp, microwave sulfur lamp, electrodeless lamps, light emitting diodes and semiconductor lighting and so on, as development of science and technology, new light source is also emerging, modern light can be to thin as paper, fine as silk, there are so many surprises, so the places still use energy-consumption light sources shall implement energy-saving lighting projects, it is not only can save energy, but also could make contribution to environment(reduction of emission of CO<sub>2</sub>). Of course, when choose higher luminous efficiency light sources, shall consider characteristics of places and electrical characteristics of light source, then retrofit primary lighting system.

● Select energy-saving lighting electrical accessories, all kinds of gas-discharge light sources need electrical accessories. Such as ballast, the old T12 fluorescent lamp inductance ballast consumes 20% of its power, for

40W lamp, the ballast power consumption is about 8W; while the energy-saving Ballasts power consumption is less than 10%, more energy-saving electronic ballasts, is only 2 ~ 3% of its power consumption, so only to update traditional T12, T10, T8 electromagnetic ballast to T5 electronic ballast, is not a small amount of power saving measures.

- Install energy-saving lighting equipments,

- Scientific and energy-efficient lighting design

(a) reasonable choice for lighting circuits: the loss of lighting circuit is about 4% of input energy, two major factors affect the loss of lighting circuit are way of power supply and area of wire cross-section. Most of the lighting voltage is 220V, there are three ways of power supply for lighting circuit single-phase second-wire, two-phase three-wire, three-phase four-wire. Three-phase four-wire power supply loss is much smaller than any other form of power supply lines. so the lighting system should use three-phase four-wire power supply as more as possible.

(b) choose reasonable control switch and full use of natural light: natural light is free of charge, shall use fully, so we should design lighting switches reasonably . Make full use of natural light, not only can improve the working environment, but also make people feel comfortable and health. Make full use of the reflected brightness of reflective surface of room, also can effectively improve the light utilization, such as the reflection coefficient of the white walls is up to 70 ~ 80%, also can play a power-saving role.

(c) Choose reasonable illumination patterns: the degree to meet the standard conditions, in order to save electric power, should properly select general lighting, partial lighting or mixed lighting , For example, the tall factory machining workshop, even use lots of lights is also difficult to achieve the

required illuminance values of fine visual work, if install a local lighting source on each lathe, it is quite easy to use little power to achieve high illumination.

(d) Choose reasonable illuminance values: it is an important issue to choose a reasonable illumination lighting design. Illumination value is too low, would undermine vision of staff, affect product quality and production efficiency. Unreasonably high illumination will waste electricity. Selected illumination must fit to vision work carried out. Lighting shall be designed according to lighting design criterias promulgated by the state, the necessary illumination lighting quality and reasonable value and excellent quality of the formation of the lighting light environment can improve the effectiveness and improve the people's mood, so shall consider comprehensive overall efficiency of lighting systems.

● **Good maintenance and management can save electricity and protect eyesight**, improving lighting electricity management is an important aspect of energy-saving lighting. Mainly measurements of energy-saving management are: energy saving publicity and education, establishment of the implementation of energy-saving lighting system, to enable people to develop the habit of turning off lights when leave; to install meters in householders, and implement fees and charges on degree; to install right dormitory quantitative power devices to limit electricity, these are all effective in reducing lighting electricity consumption. When there are contamination on light bulb, its luminous flux may be reduced to 50% below normal. If light bulbs, lamps, glass, walls is dirty, its reflectance and transmittance will also be greatly reduced. In order to ensure the luminance, the factory shall clean lighting bulbs, lamps and wall regularly. Replace timely When the lights should be flashing or flashing, this also can save energy effectively. Because the power consumption of gas discharge lighting at start up is much greater than usual.