**Calculate LED Efficiency**

**https://tinyurl.com/y2vsljgj**

The overall efficiency of an LED lamp is calculated by multiplying the individual efficiencies of all the components it contains.

Example: Calculation of overall efficiency

**LED driver (90%) · LED (35%) · optics (95%) = 30% efficiency**

**Calculation: 0.9 · 0.35 · 0.95 = 0.3 → 30%**

Do you want to calculate the efficiency of an LED light from a shop? Set the luminous efficacy (lumens per watt) in relation to the physically possible maximum (350 lm/W) for cold-white LEDs.

Example: Calculating the efficiency of an LED light

**LED illuminant delivers 1500 lumen at a power consumption of 13 watts**

**1500 Lumen : 13 Watt = 115,4→ Luminous efficacy 115,4 lm/W**

**Physical maximum (100% efficiency): 350 lm/W**

**115.4 lm/W : 350 lm/W = 0.33 → 33% Efficiency**

**Comparison of efficiency and luminous efficacy**

LED lamps and luminaires are by far the most efficient light sources of our time. However, it needs some time before all old lighting technologies are completely converted to LED. If you are about to convert old light sources to LED, the following comparison of the efficiency of the various lighting technologies will help you. Basically, the efficiency is always slightly better at higher powers.

**Efficiency of incandescent bulb**

The efficiency of well-known incandescent lamps is just 5% of the used electrical energy. The remaining 95% are released into the environment as heat. This is why even incandescent lamps with low output and low brightness become very hot during operation. The luminous efficacy of an incandescent lamp is between 10 lm/W and 15 lm/W, depending on the power class.

**Efficiency of halogen bulb**

Halogen lights have an efficiency of about 10%. The remaining 90% are radiated as heat into the environment. The luminous efficacy of a halogen lamp is between 15 lm/W and 20 lm/W, depending on the power class. The efficiency is therefore only slightly better than that of an incandescent lamp.

**Efficiency of energy-saving bulb**

After all, the energy-saving lamp achieves an efficiency of up to 25%. Here only 75% of the electrical energy is converted into heat. The luminous efficacy is 40 lm/W to 60 lm/W. The efficiency compared to the incandescent lamp is at least a factor of four to five.

**Efficiency comparison table**

Comparison of efficiency and liminous efficiency of different light sources

| **Light Source** | **Efficiency** | **Luminous Efficiency** |
|---|---|---|
| LED bulb | 25 – 40% | 80 – 150 lm/W |
| Energy-saving bulb | 15 – 25% | 40 – 60 lm/W |
| Halogen bulb | 8 – 12% | 15 – 20 lm/W |
| Incandescent bulb | 3 – 5% | 10 – 15 lm/W |