



Lamps

| Nr. Lamp type | Power rating (Watts) | Luminous flux (lumens) | Luminous flux (lumens/Watts) | Light colour | Colour rendering index |
|---|----------------------|-----------------------------|------------------------------|--------------|------------------------|
| Linear three-band fluorescent lamps | | | | | |
| 1 T5; 16 mm dia. ¹⁾ high luminous efficacy | 14 – 35 | 1,250 – 3,650 ²⁾ | 89 – 104 | ww,nw,dw | 80 – 89 |
| 2 T5; 16 mm dia. ¹⁾ high luminous flux | 24 – 80 | 1,850 – 7,000 ²⁾ | 77 – 88 | ww,nw,dw | 80 – 89 |
| 3 T8; 26 mm dia. | 18 – 58 | 1,350 – 5,200 | 75 – 90 ³⁾ | ww,nw,dw | 80 – 89 |
| Compact fluorescent lamps | | | | | |
| 4 2-, 4-, 6-tube lamp | 5 – 120 | 250 – 9,000 | 50 – 75 | ww,nw | 80 – 89 |
| 5 2-tube lamp | 18 – 80 | 1,200 – 6,000 | 67 – 75 | ww,nw,dw | 80 – 89 |
| 6 4-tube lamp | 18 – 36 | 1,100 – 2,800 | 61 – 78 | ww,nw | 80 – 89 |
| 2D-lamp | 10 – 55 | 650 – 3,900 | 65 – 71 | ww,nw,dw | 80 – 89 |
| Energy-saving lamps | | | | | |
| 7 Incandescent shape | 5 – 23 | 150 – 1,350 | 30 – 59 | ww | 80 – 89 |
| 8 Standard shape | 5 – 23 | 240 – 1,500 | 48 – 65 | ww | 80 – 89 |
| 230 V halogen lamps | | | | | |
| 9 with jacket | 25 – 250 | 260 – 4,300 | 10 – 17 | ww | ≥ 90 |
| 10 miniature | 25 – 75 | 260 – 1,100 | 10 – 15 | ww | ≥ 90 |
| 11 with reflector | 40 – 100 | | | ww | ≥ 90 |
| 12 with base at both ends | 60 – 2,000 | 840 – 44,000 | 14 – 22 | ww | ≥ 90 |
| Low voltage 12 V halogen lamps | | | | | |
| 13 with reflector | 20 – 50 | | | ww | ≥ 90 |
| 14 pin-based lamps | 5 – 100 | 60 – 2,300 | 12 – 23 | ww | ≥ 90 |
| Metal-halide lamps | | | | | |
| 15 with base at one end | 35 – 150 | 3,300 – 14,000 | 85 – 95 | ww,nw | 80 – 89, ≥ 90 |
| 16 with base at both ends | 70 – 400 | 6,500 – 36,000 | 77 – 92 | ww,nw | 80 – 89, ≥ 90 |
| High-pressure sodium vapour lamps | | | | | |
| 17 tubular | 35 – 1,000 | 1,800 – 130,000 | 51 – 130 | ww | 20 – 39 |
| Low-pressure sodium vapour lamps | | | | | |
| 18 tubular | 18 – 180 | 1,800 – 32,000 | 100 – 178 | yellow | |
| Light emitting diodes | | | | | |
| 19 LED | 0.7 – 1.5 | 18 – 27 | 13 – 23 | | |

Light colour: ww = warm white, nw = neutral white, dw = daylight white

¹⁾ for EB operation only ²⁾ luminous flux at 35° C ³⁾ luminous efficacy increases to



| Base |
|-----------------------|
| G5 |
| G5 |
| G13 |
| G23, G24, GX24, 2G7/8 |
| 2G11 |
| 2G10 |
| GR8, GR10, GRY10 |
| E14, E27 |
| E14, E27 |
| E14, E27 |
| G9 |
| E14, E27, GZ10, GU10 |
| R7s |
| GU5.3 |
| G4, GY6.35 |
| G12, G8.5 |
| RX7s, Fc2 |
| E27, E40 |
| BY22d |

81 – 100 lm/W with EB operation

than incandescent lamps and achieve higher luminous efficacy. They are fully dimmable and available also as reflector lamps.

Low-voltage 12 V halogen lamps (13, 14)
Low-voltage halogen lamps produce an agreeable white light with very good colour rendering properties. To operate them, a transformer is needed to reduce the voltage to 12 V. With appropriate transformers, they can be dimmer-controlled. IRC (Infra-Red Coating) lamps consume 30 % less power for the same luminous flux.

Metal halide lamps (15, 16)
These lamps are noted for their high luminous efficacy and excellent colour rendering properties. Modern metal halide lamps have a ceramic burner, which produces light of a constant colour throughout the lamps' life. A ballast is needed to operate metal halide lamps. EB operation makes for a longer lamp life and enhanced lighting comfort.

High-pressure sodium vapour lamps (17)
Very high luminous efficacy and long lamp life make high-pressure sodium vapour lamps a highly economical option for outdoor lighting. They consume only half as much power as high-pressure mercury vapour lamps. Appropriate ballasts and igniters are needed to operate high-pressure sodium vapour lamps.

Low-pressure sodium vapour lamps (18)
This type of lamp is noted for having a higher luminous efficacy than any other. Because of its monochromatic beam, it is particularly good at penetrating fog and mist. Low-pressure sodium vapour lamps are used for illuminating port and lock control installations and for security lighting.

Light-emitting diodes (19)
LEDs come in numerous shapes and colours. They are extremely small, have a high resistance to impact and a very long service life and emit neither IR nor UV radiation. Given a special fluorescent coating, LEDs produce white light. LEDs are designed for d.c. operation.

Good lighting depends on the right choice of lamp. Below are the most important lamp types and their specifications.

Three-band fluorescent lamps (1, 2, 3)
Three-band fluorescent lamps offer high luminous efficacy coupled with good colour rendering and a long service life. Operated by electronic ballasts (EBs), they achieve an even higher luminous efficacy and longer service life. 16 mm-diameter T5 lamps are designed for EB operation only. With appropriate EBs, all three-band fluorescent luminaires can be dimmer-controlled.

Compact fluorescent lamps (4, 5, 6)
Compact fluorescent lamps have the same characteristics as three-band fluorescent lamps. Here too, luminous efficacy, service life and lighting comfort are enhanced by electronic ballasts and dimmer control is possible with appropriate EBs.

Energy-saving lamps (7, 8)
Energy-saving lamps have a built-in ballast and a screw base (E14 or E27). They consume as much as 80 % less power and have a considerably longer life than incandescent lamps.

230 V halogen lamps (9, 10, 11, 12)
Halogen lamps for line operation produce an agreeable white light with good colour rendering properties. They have a longer service life