

Short G9 Capsules

Self-shielded halogen capsules

Product information

G9 mains voltage capsules are very compact light sources. They use patented leading edge technology of filament support, which eliminates the disadvantages of the earlier bridge-type designs. In this lamp two opposite small parts of the quartz glass tube are pressed together during manufacturing, and the filament is held by this glass portion called "dunching". There are no additional metal and glass parts inside the capsule, which provides extreme safe end-of-life behaviour. For this reason G9 lamps made with dunching are self-shielded.

Bulbs are made from a quartz material which blocks virtually all UV-B and UV-C radiation. This material is doped with cerium and titanium which provides an effective barrier to potentially harmful ultra-violet radiation while maintaining the other high quality properties of standard clear fused quartz.

The bent filament types have been specifically developed and manufactured to satisfy the demand of balance between the luminous output, life and mechanical stiffness.

The lamps provide small light centre in the same position at all wattages. This allows to design luminaires with reflective surfaces as spot reflectors or with refractive glass parts providing special light patterns. The G9 family of lamps covers a range of illuminances for a variety of residential and commercial requirements.



Features

- Self shielded, therefore can be operated in open fixtures
- UV radiation falls much below the international threshold values
- Dimmable
- Rated average life: 1,000 to 2,000 hours

Applications

- General lighting for residential and commercial purposes, especially illumination of light sensitive objects in shop-windows, galleries, museums, etc.
- Task lighting

IEC Standards

GE tungsten halogen lamps comply with the following international standards where applicable:

- IEC 60432-3 Tungsten Halogen Lamps Safety
- IEC 60357 Tungsten Halogen Lamps Performance
- IEC 60061-1 Lamp Caps & Holders, Part 1: Lamp caps

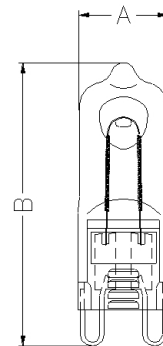


Specification summary

Wattage [W]	Rated Wattage [W]	Volt [V]	Cap	Description	Product Code	Lumen [lm]	Colour [K]	Life [Hrs]	Warm Up Time 60%	Switching Cycle [on/off]	Energy Class
18	18,0	230	G9	TU SHORTG9 18W CL 230V GE HFBL 2/20 MIH	77089	170	2700	2000	instant on	8000	D
18	18,0	240	G9	TU SHORTG9 18W CL 240V GE HFBL 2/20 MIH	77086	170	2700	2000	instant on	8000	D
25	25,0	230	G9	TU SHORTG9 25W CL 230V GE HFBL 2/20 MIH	41943	260	2700	1500	instant on	6000	D
25	25,0	230	G9	TU SHORTG9 25W CL 230V GE BX 1/10 MIH	45692	260	2700	1500	instant on	6000	D
25	25,0	230	G9	TU SHORTG9 25W CL 240V GE HFBL2/20/800TR	75271	260	2700	1500	instant on	6000	D
25	25,0	240	G9	TU SHORTG9 25W CL 240V GE HFBL 2/20 MIH	26318	260	2700	1500	instant on	6000	D
25	25,0	240	G9	TU SHORTG9 25W CL 240V GE BX 1/10 MIH	88941	260	2700	1500	instant on	6000	D
25	25,0	240	G9	OT SHORTG9 25W CL 240V GE HFBL 2/20 TR	78135	255	2700	2000	instant on	8000	D
28	28,0	230	G9	TU SHORTG9 28W CL 230V GE HFBL 2/20 MIH	77088	340	2800	2000	instant on	8000	D
28	28,0	240	G9	TU SHORTG9 28W CL 240V GE HFBL 2/20 MIH	77085	340	2800	2000	instant on	8000	D
30	30,0	230	G9	TU SHORTG9 30W CL 230V GE HFBL 2/20 MIH	77074	415	2800	1000	instant on	4000	C
30	30,0	240	G9	TU SHORTG9 30W CL 240V GE HFBL 2/20 MIH	78575	415	2800	1000	instant on	4000	C
40	40,0	230	G9	TU*SHORTG9 40W CL 230V GE BX 1/10 MIH	22504	490	2800	3000	instant on	12000	D
40	40,0	230	G9	TU SHORTG9 40W CL 230V GE HFBL 2/20 MIH	41946	490	2800	3000	instant on	12000	D
40	40,0	230	G9	TU SHORTG9 40W CL 230V GE BL 3/30 MIH	78093	490	2800	3000	instant on	12000	D
40	40,0	240	G9	TU*SHORTG9 40W CL 240V GE BX 1/10 MIH	22498	490	2800	2000	instant on	8000	D
40	40,0	240	G9	TU SHORTG9 40W CL 240V GE HFBL2/20 MIH	26316	490	2800	2000	instant on	8000	D
40	40,0	240	G9	TU SHORTG9 40W CL 240V GE HFBL 2/20 MIH	42854	490	2800	2000	instant on	8000	D
40	40,0	240	G9	TU SHORTG9 40W CL 240V GE BL4/40 MIH	88367	490	2800	2000	instant on	8000	D
40	40,0	240	G9	TU SHORTG9 40W CL 240V GE HFBL2/20/800TR	75270	490	2800	2000	instant on	8000	D
40	40,0	240	G9	OT SHORTG9 40W CL 240V GE HFBL2/20 TR	78136	490	2800	2000	instant on	8000	D
40	40,0	240	G9	OT SHORTG9 40W CL 240V GE BL 4/40 TR	78137	490	2800	2000	instant on	8000	D
42	42,0	230	G9	TU SHORTG9 42W CL 230V GE HFBL 2/20 MIH	77087	630	2800	2000	instant on	8000	C
42	42,0	230	G9	TU SHORTG9 42W CL 230V GE PLBX 1/10 MIH	77530	630	2800	2000	instant on	8000	C
42	42,0	240	G9	TU SHORTG9 42W CL 240V GE HFBL 2/20 MIH	77084	630	2800	2000	instant on	8000	C
45	45,0	230	G9	TU SHORTG9 45W CL 230V GE PLBX 1/10 MIH	75706	710	2900	1000	instant on	4000	C
45	45,0	230	G9	TU SHORTG9 45W CL 230V GE HFBL 2/20 MIH	77075	710	2900	1000	instant on	4000	C
45	45,0	240	G9	TU SHORTG9 45W CL 240V GE HFBL 2/20 MIH	78576	710	2900	1000	instant on	4000	C

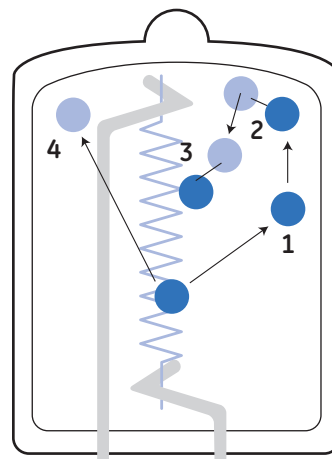
Dimensions

Wattage	B Length [mm]	A Diameter [mm]
18	43	13
25	43	13
28	43	13
30	43	13
40	43	13
42	43	13
45	43	13



Tungsten halogen principle

The tungsten filament is enclosed in a gas filled quartz bulb, together with a controlled quantity of halogen. At the operating temperature some tungsten evaporates and migrates to the cooler areas of the bulb wall where before it can be deposited, it combines with the halogen to form a tungsten halide. This circulates until it comes near the filament where the halide dissociates and deposits the tungsten back on the filament. This cycle continues throughout the operating life of the lamp. As the bulb wall remains clean the bulb size can be reduced considerably by the use of quartz which can withstand the high wall temperatures required by the halogen cycle. The small bulb and strong materials withstand much higher working pressures, this reduces filament evaporation, thus offering increased performance either as more light or longer life.

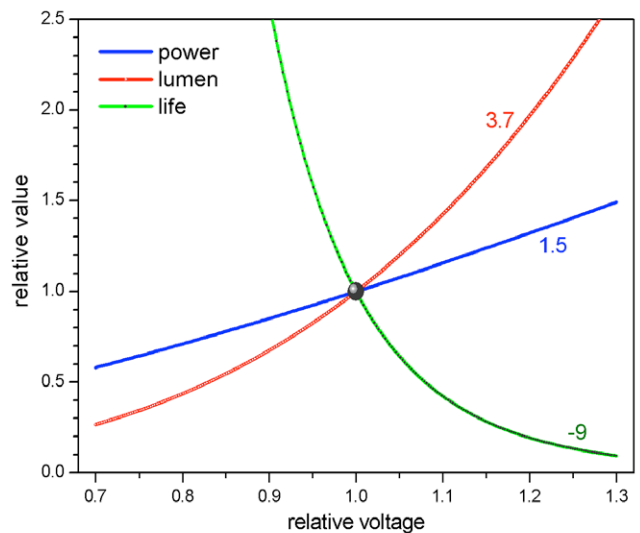


1. Tungsten evaporation
2. W- halogen reaction at bulb
3. Halogen returns to filament
4. Halogen returns to cycle

Bulb remains clear, "hot-spot" forming delayed

Light, life & Voltage

For any particular lamp, the light output and life depend upon the voltage at which a lamp is operated. For instance, as approximations, the light output of G9 lamps varies as the 3.7th power of the voltage and the life varies inversely as the 9th power of the voltage. The chart below illustrates the effects of overvoltage or undervoltage applied to lamp on its power, life and light output. The values given are reasonably valid between 70% and 130% rated voltage. Since the halogen cycle is optimized at rated voltage, a certain degree of bulb blackening occurs at overvoltage. The chart applies only for A.C. operation. The life may be reduced for lamp operation on half-wave rectified or D.C. voltage because of a harmful unidirectional tungsten diffusion within the coil. Phase-splitting semiconductor dimming devices have no reducing effect on life.

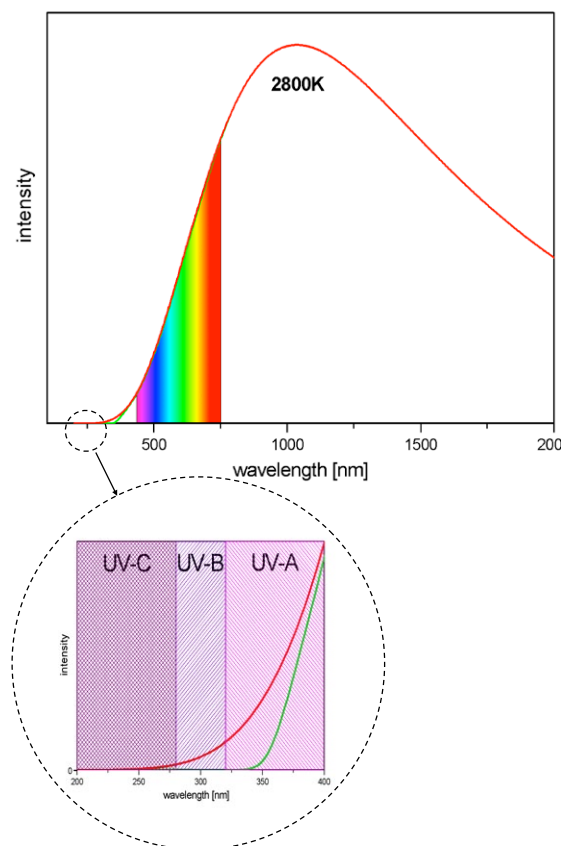


UV radiation

The hot filament emits only a small amount of energy in the UV range according to the blackbody radiation. The fused quartz material used for GE G9 halogen lamps blocks virtually all remaining UV-B and UV-C radiation (see the charts below) and decreases the UV-A radiation much below the international standards. It means that even in the case of very high illumination levels, the use of these lamps has no harmful effects to material and living being at all.

End-of-life behaviour

The dunching technology applied for G9 lamps provides extremely safe end-of-life behaviour. Since the lamp does not contain additional metal parts, the risk of high current arcing when a lamp burns out is essentially eliminated. The measured I^2t values are below $0.02 \text{ A}^2\text{s}$ for each GE G9 lamp, so no additional fuse is required in the circuit. The G9 lamps serve as its own fuse.



Operation and Maintenance

- Fuse is not required in circuit.
- Observe temperature requirements — pinch seal, max. 350°C, bulb wall min. 250°C.
- Bulb wall temperatures in operation are high and therefore lamps should not be operated in flammable atmospheres unless enclosed in suitably rated luminaires.
- Lamps should be kept free from contamination, including finger print marks, before lamp is operated. Lamps can be cleaned with a soft cloth moistened with alcohol.
- Good condition of the lampholder contacts is important to ensure proper operation of lamp.
- Ensure lamp is cool before removing.
- Handle with care - the fill pressure of the capsule is 5.5 bar.
- Rapid cycling can shorten lamp life and designers should take advice from their GE Lighting representative before using these lamps in flashing or blinking applications.
- The lamps may be dimmed by reducing voltage. However, this may cause the bulbs to blacken. If this occurs the lamp should be run at full voltage for fifteen minutes, thereby clearing the problem.
- Switch off mains supply before installing/removing lamp.