

Amalgam Lamp Technology

Start/ Ignition

Immediately after the starting phase of an Amalgam lamp, all the mercury is chemically combined in the Amalgam spot. The Amalgam is fixed on the gold spot inside the lamp. As soon as the bulb gets ignited, it is nearly a noble gas discharge inside. After a short while, the current heats up the lamp. So, the mercury evaporates out of the Amalgam spot into the plasma. The duration between ignition and full power differs from 5 to 15 minutes, depending on the lamp specification, its dimensions as well as cooling conditions. For brand new lamps, this time can be very different because of not finished chemical reactions in the bulb or on the filaments. This is absolutely characteristic.

To stabilize our lamps, we burn them for a few hours and monitor their working conditions. The chemical balance is more stable after 100 hours in operation, but the process after the start remains the same. It still takes approx. 5 to 15 minutes to reach the full power. The UV-lamps with a long starting phase are not worse in comparison to bulbs with a faster heat-up ramp.

Each and every lamp which left our facilities can be used without concern since it had to pass a 100% quality check.

Temperature

The minimum lamp surface temperature for efficient operation is approx. 100°C. A temperature of around 120°C is optimal for the Amalgam process and causes the highest UV-output. Hence, the temperature should be measured directly on the Amalgam spot. Temperatures above 140°C are critical and will destroy the Amalgam. Then, it is going to drop down and melt away.

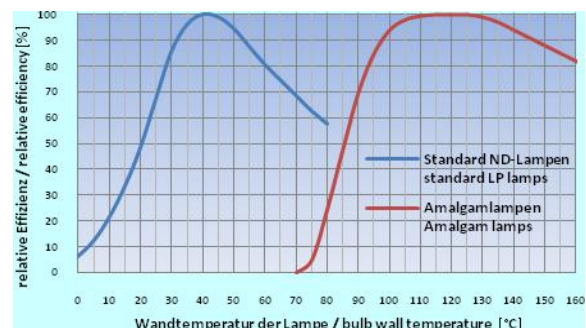
Should these types of lamps be operated in low ambient temperatures, they shall be protected with an immersion tube or submersible tube system to achieve their optimal UV-output. Otherwise, the lamps can not reach their normal operation temperature of approx. 100°C minimum. Depending on the ambient temperature and its cooling, a lamp may need more time to reach its maximum UVC-power.

Working conditions/ Lamp cooling

It is essential to operate the lamps under optimal working conditions. The lamp surface temperature should be between 110-120°C. Following parameters can be changed to reach the optimum:

- geometry of the submersion tube, its diameter and wall thickness
- lamp voltage (please ask for lamps with modified filling)
- lamp current (please ask for especially adjusted ballasts)
- ambient temperature around the quartz tube
- water/ air flow rate around the quartz tube

Due to the wide range of applications, it is just possible to give a rough recommendation for suitable combinations of these parameters (see table below). Beside the temperature measurement, the UVC-output value is a good indication, if the optimum is reached. The adjacent diagram shows the correlation between UV-intensity and surface temperature of an Amalgam lamp in comparison to a standard UV-lamp.



Lamp quartz Ø	Lamp base Ø	Recommended immersion tube	Water temperature range
15 mm	19 mm	23 x 1.5 mm	5 - 60°C
19 mm	23 mm	30-32 x 1.5-2.0 mm	5 - 60°C
25 mm	29 mm	34-36 x 2.0 mm	5 - 50°C