



Operation

The SpAOP UV-C uses a special UV lamp that emits energy at wavelengths of both 254 nm and 185 nm. UV radiation at the specific wavelength of 185 nanometres is highly energetic and has enough energy to break molecular bonds in water molecules (H<sub>2</sub>O). By doing so free radicals (•OH) will be created in the water through a process known as photodissociation. The newly formed free radicals react with dissolved substances and (in)organic pollutants, leading to the oxidation of these substances. This improves the transmission rate which in time benefits the regular UV-C disinfection.

Double function, double performance

The Blue Lagoon SpAOP UV-C's efficiency is based on the units special double-function lamp that produces both direct OH-radicals, that have an even stronger oxidizing power than ozone, and UV-C disinfection, ensuring that the water is disinfected and purified at the same time.

Sustainable & Efficient Performance, Easy Maintenance

The double function lamp has an efficient lamp life up to 9 000 hours with an LED replacement indication integrated in the ballast. In addition to the long lamp life, the Blue Lagoon SpAOP UV-C is easy to install and maintain, making it a sustainable, easy to install and maintain, energy efficient and cost-efficient water treatment for Spa and Hot Tub.



Reliable and effective disinfection

The by the UV lamp emitted UV-C energy at a wavelength of 254 nm is responsible for the disinfection of the water. This wavelength is absorbed by the DNA/RNA of microorganisms and viruses and because of this their reproduction mechanism is damaged. This results in a reliable disinfection of the water. Not only bacteria but also viruses, spores, algae, moulds, yeasts and protozoa including Cryptosporidium and Giardia will be eliminated.

What is AOP by Photodissociation?

The Advanced Oxidation Process (AOP) in the Blue Lagoon SpAOP UV-C is an oxidation process based on OH-radicals. The 185 nm emitted by the UV lamp is absorbed by the water molecules resulting the generation of OH-radicals. OH-radicals are the strongest in water available oxidant and will oxidise organic and inorganic pollutants present in the water. The 185 nm wavelength based AOP process improves the water quality by improving the visibility and smell of the water.

Because of the disinfection of the water by the 254 nm wavelength and the oxidation of the water by the 185 nm wavelength makes the Blue Lagoon SpAOP UV-C the perfect addition to your Spa water treatment process.

Complete process AOP by Photodissociation

**UV-C Absorption:** Water molecules (1) absorb the UV radiation at 185 nm. This absorption is facilitated by the oxygen-hydrogen (O-H) bonds within the water molecule.

**Bond Breakage:** The absorbed UV radiation provides enough energy to break the O-H bonds in the water molecule, leading to the formation of hydroxyl radicals (2).

**Formation of Free Radicals:** The hydroxyl radical (•OH) is highly reactive. Free radicals are highly reactive and unstable, seeking to stabilize themselves by either gaining electrons. This gives them a high oxidation potential.

**Chemical Reactions:** The newly formed free radicals react with organic and inorganic substances, leading to the degradation of these substances which also improves the water quality and UV transmittance rate. Because of the double function of the lamp (creating free radicals and disinfection by UV-C) the improvement of the transmittance rate will also benefit the disinfection rate from the water which is disinfected in the same time.

**The lifetime of OH-radicals** is extremely short, because of that the entire treatment process takes place within the UV treatment chamber. Treated water (3) is without •OH-radicals

Benefits AOP by Photodissociation :

- **Efficiency:** With direct UV radiation at 185 nanometres, we use the power of photon energy to break down water molecules directly, creating hydroxyl radicals (•OH) leaving contaminants no chance.
- **Precision Targeting:** Our technology precisely targets the oxygen-hydrogen bonds within water molecules, guaranteeing the highest level of contaminant oxidation.
- **Maximum Reactivity:** The high energy of UV radiation at 185 nanometres initiates immediate reactions, improving the colour and smell of the water.
- **Cost-Efficient Solution:** Unlike traditional methods direct UV-C radical generation technology offers a cost-efficient alternative by eliminating the need for ozone generation.
- **Environmental Sustainability:** Our innovative approach minimizes the use of chemicals and eliminates harmful by-products.

