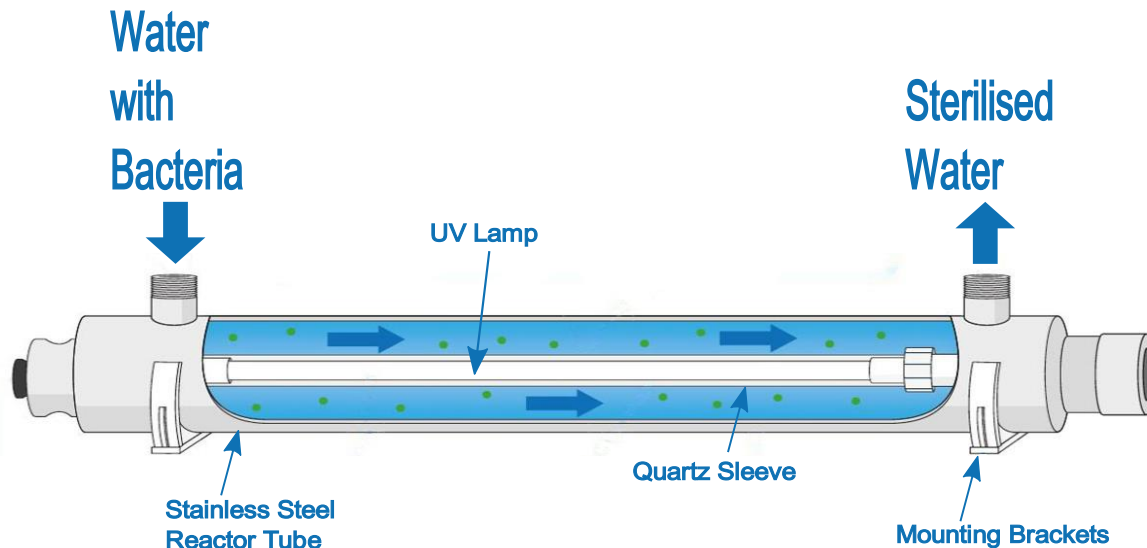


Ultraviolet (UV) light is an extremely effective way of inactivating and killing bacteria in water. No known bacteria or virus is resilient to UV light. This includes pathogens such as Cryptosporidium and Giardia, which water treatment alternatives such as chlorine is unable to treat.

Ultraviolet technology has been around for more than 60 years, and its effectiveness has been well documented both scientifically and commercially. UV disinfection systems are installed worldwide and is a recognized method for water treatment.

The disinfection of the water occurs within a stainless steel reactor tube. Inside the reactor tube is a quartz sleeve and a UV lamp.



The glass quartz sleeve holds the UV lamp and protects it from direct contact with the water. It is transparent to the UV wavelength, which allows UV light to penetrate the glass and disinfect the water. A couple of o-rings hold it in place and prevent leakage.

A low pressure mercury vapour lamp is used to produce UV light at 254nm. This is in the UV-C part of the electromagnetic spectrum and is optimal for germicidal action.

UV-C light at 254nm is very effective in inactivating microorganisms. No known bacteria or virus is resilient to UV light. It penetrates the cell walls of bacteria, viruses and protozoa, permanently damaging their DNA, making them unable to infect or reproduce.

The effectiveness of a UV steriliser is measured in energy per square centimetre (mJ/cm²). UV systems for domestic use typically are rated at 30mJ/cm², which is well in excess of the 16mJ/cm² required to deactivate e-coli.

UV systems are effective at deactivating up to 99.9% of harmful microorganisms in water. These include:

e-coli	Viruses	Dysentery bacilli
Salmonella	Mycobacterium tuberculosis	Streptococcus
Fungi	Hepatitis B	Cholera
Algae		

UV sterilisation can help reduce microorganisms such as Cryptosporidium and Giardia. These organisms have thick cell walls that protect them and inhibit UV light from penetrating.

Advantages of a UV water sterilisation

- **Disinfects without chemicals.** Ultraviolet wavelength does not leave the by-products in water that chemical disinfectants do.
- **Adds no tastes or odours.** UV disinfection does not chemically alter the water in any way, shape, or form.
- **Easy to maintain.** An annual UV lamp change is the most frequent maintenance need.
- **Does not waste water.** The UV treatment process does not output any water to the drain.
- **Immediate treatment.** No need for holding tanks or long retention times.
- **Automatic operation** without special attention or measurement, operator friendly.
- **Easy installation.** Only two water connections and a power connection.
- **Environmentally friendly,** no dangerous or toxic chemicals to handle, no problem of overdosing (it's impossible), no need for specialized storage equipment.
- **Cost effective.** Low initial capital cost and reduced operating expenses compared to alternate technologies.

Disadvantages of a UV water purifier

- **Does not remove contaminants.** UV only deactivates living organisms, so the system needs prefiltration to remove loose particles.
- **Heats the water.** When you are not running water and it is sitting in the chamber, the UV lamp heats the water up.
- **Does not work during a power outage.** A UV system requires electricity to run.
- **Does not work unless water is clear.** Ensure that you have appropriate prefiltration installed before water reaches your UV system.

UV-C light is harmful to humans just as it is for microscopic living organisms. However, you are not at risk of exposure unless you touch or look at the UV bulb while it is on.

The UV light must be able to “see” the bugs in order to kill them. If the water entering the UV reactor tube is dirty, then the UV purification will not be as effective. Hence all UV Treatment systems must use sediment filters prior to presenting the water to the UV lamp.

It is recommended that water passed through a UV system fall within the following parameters:

- Iron: < 0.3 ppm (0.3mg/L)
- Hardness* : < 7 gpg (120 mg/L)
- Turbidity: < 1NTU
- Manganese: < 0.05 ppm (0.05 mg/L)
- Tannins: < 0.1 ppm (0.3 mg/L)
- UV Transmittance: > 75%

If a UV water purifier is well maintained it will last many years., Maintenance is straightforward and can be done by a competent home handyman.

- **Replace the UV lamp once a year.** The output of UV lamps decreases by about 15% per annum. After a year the lamp may continue to shine, but it will not be as effective in killing off the undesirable microorganisms. A UV lamp lasts about 9,000 hours or roughly 1 year before it needs to be replaced.
- **Clean the quartz sleeve.** The glass quartz sleeve that surrounds the lamp needs to be clean for the UV light to “see” the water and kill the bugs. Check the quartz sleeve when you change the lamp. If necessary, carefully clean the quartz tube with soapy water.
- **Replace the pre-filters at least once a year.** The UV light needs to “see” the bugs in order to kill them. If the pre-filters are not replaced regularly, the water presented to the UV lamp will become dirty, and UV light will not be able to disinfect the water.