



How does UV radiation work?

- 💧 **Ultraviolet** or **UV**-light is light outside the range usually detectable by the human eye. It can be used to deactivate protozoans so that they can't reproduce and to significantly reduce the bacteria in water.
- 💧 UV radiation kills or inactivates micro-organisms, provided each organism receives a minimum amount of radiation. UV radiation functions on the principle that each unit of water must be exposed to the radiation for a minimum amount of time at minimum dosage intensity.
- 💧 Commercial UV units are used to disinfect water in many small- and large-scale water treatment plants. UV disinfection units have been used for many years and the process is accepted as an effective disinfection method.
- 💧 It is important that the water to be disinfected is properly pre-treated to ensure a low turbidity, preferably lower than 0,5 NTU. If the water contains high turbidity levels, the colloids either absorb some of the radiation or shield the micro-organisms against radiation, which reduces the effectiveness of the process.
- 💧 A further important aspect is that the UV tubes are prone to the formation of layers of scale or other fouling material. This also reduces the effectiveness of radiation. It is therefore important that the tubes are regularly inspected and cleaned to prevent formation of scale or accumulation of other material on them.

What are the disadvantages and advantages of UV radiation?

UV is as effective as chlorine in destroying micro-organisms.

The **main advantage** of UV disinfection compared to chlorine for small-scale and rural applications is that the handling and dosing of hazardous chlorine compounds is eliminated.

- ✓ UV disinfection is a physical process rather than a chemical disinfectant; thus eliminating the need to generate, handle, transport, or store toxic/hazardous or corrosive chemicals.
- ✓ There is no residual effect that can be harmful to humans or aquatic life.
- ✓ UV disinfection has a shorter contact time when compared with other disinfectants (approximately 20 to 30 seconds with low-pressure lamps).
- ✓ UV disinfection equipment requires less space than other methods.

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The **main disadvantage** of UV disinfection is the fact that there is no residual protection against recontamination. It also has a high operating cost and it must be kept in mind that anything which blocks UV light from reaching the water will result in a lack of treatment.

- ✓ Low dosages may not effectively inactivate some viruses, spores, and cysts.
- ✓ Turbidity and total suspended solids (TSS) in the wastewater can render UV disinfection ineffective. UV disinfection with low-pressure lamps is not as effective for secondary effluent with TSS levels above 30mg/L.
- ✓ UV disinfection is not as cost-effective as chlorination, but costs are competitive when chlorination-dechlorination is used.
- ✓ There is no measurable residual to indicate the efficacy of UV disinfection.

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