

Aquarius Drilling Services

Water Bore Construction - Pump Installation - Irrigation - Water Treatment

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Ultra Violet Disinfection

What is Ultra violet disinfection?

Ultra violet is the oldest form of disinfection perhaps known to man. It is passive, bacteriostatic and offers no residual kill power whatsoever. This is distinct from chlorination which is now a familiar form of disinfection to all.

Ultra violet is contained within a stainless steel chamber. It is a penetrating ultra violet light with such intensity that it will kill bacteria on contact. Its power is derived from different wavelengths of light. The basic power starts at 40 watts of sanitation power. This creates a standard wavelength or you can go higher by adding stronger lamps or more of them.

When the water supply to be treated enters the chamber it will actually spin around the UV lamp a number of times allowing a good effective kill ability of bacteria. The water to be treated must be clean by filtration. It must also be pre-treated with a suitable water treatment if it has a problem such as iron or colloidal clay etc. All contaminants must be removed for effective U.V. disinfection to occur.

The ultraviolet light must not ever refract within the chamber. This means that it must be able to travel in a straight line to the outer walls of the vessel and not refract off particles in the water. Once refraction has occurred effectiveness begins to fall by percentage and bacteria can pass through unharmed.

The turbidity guideline for effective U.V. sanitation is less than 5 NTU which is a measuring term for all clean water. One NTU is the most preferable standard. There must be no colour present.

It is the ultra violet light coming into clean contact with bacteria that destroys it. Some bacteria may require a more intense wavelength or multiple U.V. lamps in one chamber.

Particles definitely include trace elements such as soluble iron. For example you would not pump filtered channel water or dam water into a U.V. chamber and expect it to work.

Life expectancy

The ultraviolet tube has a life expectancy of 12 months of constant use. Constant switching on and off will shorten this period considerably. The water flow in litres per minute must be matched by the correct sized U.V. chamber. It is not unusual to pass water through two U.V. systems in a row to guarantee a kill of all bacteria.

Installation and Commissioning of Ultra Violet

The water must be pre-filtered, pre-treated or brought to a standard suitable for this treatment.

Once the system is installed proper commissioning is achieved by using a biocide to strip all possible bacteria from places even within the U V chamber down to every last point of use in all plumbing.

This is essential as U.V. disinfection has absolutely no residual action. Some U.V. systems claim to emit ozone as well as the UV light effect. This must never be relied upon for down-line disinfection

Types of Ultra Violet Installations.

For single point use, or one tap, a small system of 6 litres per minute approximately is sufficient. This would require a pre-filter, the U.V. chamber then a post-filter. I must mention that ultra violet heats the water up if left sitting in the chamber. This means that the heat given off by constant contact between the U.V. tube and the static water in the chamber will become warm. The simplest way to deal with this is either waste some water or fill a kettle or jug.

I do not recommend single point systems as they can be problematic.

The most recommended.

For multiple tap use simply calculate the flow ability of the plumbing or match the plumbing outlet against that of the Ultra violet system is being fitted to. The most common size is 25-40 litres per minute. That flow would be well catered for by a 20mm UV unit.

Maintenance

The intervals for UV lamp replacement and cleaning should not exceed 12 months. There are uses where the service life is so critical that require service to be more often.

Maintenance includes, stripping the system, cleaning, changing O rings as required then installing the new lamp and re-starting.

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