

**WATER TREATMENT** – processes used to make water more acceptable for a desired end-use. These can include use as drinking water, industrial processes, medical and many other uses. The goal of all water treatment processes is to remove existing contaminants in the water, or reduce the concentration of such contaminants so it becomes fit for its desired end-use.

**METHODS** - processes involved in treating water may be physical such as settling, chemical such as disinfection or coagulation, or biological such as lagooning, slow sand filtration or activated sludge.

There are **THREE KEY PRINCIPLES OF WATER TREATMENT** for microbiological safety.

**1. MINIMISATION** – Minimise the number of contaminants getting into the water supply

- choose a good source
- manage activities in the catchments

Water Sources - water quality varies from different sources

- How much water is needed?
- What treatment will be needed?
- How much does quality vary?
- Is the supply flow reliable?
- What are the environmental impacts of the water take?

**2. REMOVAL** – Physically remove bacteria, viruses and other contaminants from the water

- screens and filtration
- coagulation and settling

Pre-Treatment - to reduce the load on the main treatment plant

- What are the pre-treatment options?
  - Storage / Pre-settlement - ability for larger sediment to settle; allows selective abstraction (can turn off source when quality is poor)
  - Pre-filtration - does not remove fine sediment; reduces load on treatment processes
  - Aeration - oxidises iron and manganese so it can be filtered out; reduces odours; makes water less corrosive to pipework

Treatment - to physically remove contaminants from the water

- Filtration – Cartridge filters; Membranes; Rapid gravity filters or Pressure filters
  - Operators require appropriate training

**3. INACTIVATION** – Inactivate the remaining germs/bugs (pathogens) by disinfection

- Chlorination
- Ultraviolet light to inactivate germs (pathogens).

Disinfection – destroy/inactivate harmful germs (organisms) carried in the water

▪ **Chlorination**

- Chlorine can have a residual effect (a chlorine residual remains available to kill germs/bugs (pathogens) through to the end user)
- Chlorine gas; On-site generation; Sodium hypochlorite or Calcium hypochlorite
- Hypochlorite - very simple; chemical solution tank; dosing pump

▪ **Ultraviolet light**

- Germs (pathogens) are killed by high energy uv radiation
- Effective against Giardia and Cryptosporidium (protozoa)
- UV transmittance to be greater than 80%
- Turbidity (dirt) to be less than 1.0 ntu
- No residual effect



For further information see DWAP at [www.drinkingwater.co.nz](http://www.drinkingwater.co.nz)  
Editorial by Damian Lawsen – Alpha Pipelines.