

WHY DO WE NEED TO TREAT DRINKING WATER?

Drinking water is treated to kill or inactivate any pathogenic micro-organisms such as viruses, bacteria and parasites, to remove inorganic and organic trace contaminants which have found their way into the water system because of pollution and to reduce the naturally occurring organic compounds such as humic acid and algal metabolites. In general, surface waters such as lakes and rivers contain higher levels of micro-organisms and are more prone to contamination than groundwater and require different treatment regimes. To reduce the risk to consumers, more and more countries are introducing new drinking water regulations containing stricter limits on pathogens and contaminants.

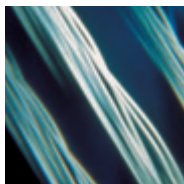
OUR SOLUTION TO YOUR PROBLEM

Because of their comprehensive portfolio, Ozonia and Aquasource can offer a wide range of solutions for municipal applications. The Degrémont Technologies' products have been designed so that they can be integrated into all types of treatment steps with the minimum amount of work and time. Equipment technologies include a large spectrum of Ultrafiltration membranes, UV reactors and ozone generators. Depending on the application in question, Ozonia and Aquasource can supply either a single technology or adopt a multi-process approach to achieve the desired result.

MEMBRANES

Ultrafiltration is a major step forward for municipalities concerned about:

- Offering water of constant quality regardless of the quality and turbidity variations of the source water. As physical barriers, ultrafiltration membranes retain all micro-organisms such as bacteria and viruses as well as the suspended solids.
- Contributing to environmental protection. As a mechanical process, Ultrafiltration reduces the use of chemical products and waste treatment steps, while maintaining the mineral balance of water.
- Adopting a universal procedure which can be installed as a single treatment phase or incorporated in a more complex treatment line, Aquasource Ultrafiltration units have flow rates from 3 to 200 m³/h.



UV

UV systems disinfect by inactivating pathogenic micro-organisms, such as viruses, bacteria and parasites. In the UV-C light spectrum (200-280 nm), the wavelength 254 nm is the most efficient wavelength to inactivate micro-organisms by damaging the nucleic acids (DNA and RNA), which disrupts the organism's ability to replicate.

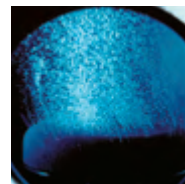
In normal applications, UV has the advantage that no chemicals are added to the process and that no disinfection by-products are formed. Owing to the small foot print, the UV equipment can be easily integrated into most existing installations.



OZONE

Ozone has been used by municipal bodies for many years to improve the organoleptic qualities of water and for its germicidal action. Ozone has many additional benefits in the drinking water process:

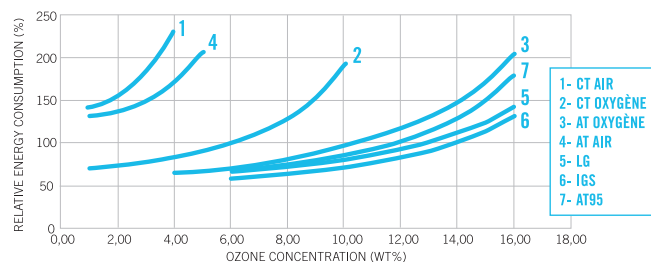
- In preozonation, ozone improves clarification, avoids the transformation of precursors to haloforms, reduces iron and manganese and promotes the destruction of micro-organisms such as algae.
- Main ozonation treatment breaks down trace contaminants and enhances the biodegradability of organic substances which are then removed in a biological treatment step.
- Finally, combined treatment steps involving ozone and activated carbon or ozone and peroxide are currently the most powerful means available to water process engineers for the removal of contaminants and constitute a vital safeguard against contamination entering a drinking water system.



OZONE

Ozonía offers clients state of the art equipment reflecting the very latest dielectric and power electronic technologies. In addition, clients can profit from a unique professional expertise and over thirty years of experience in ozone generation and application know-how. A widely proven and reliable medium frequency technology results in very high ozone yields from both oxygen and air. With thousands of installations around the world, several of them over 250 kg/h, Ozonía offers unrivalled international experience.

The table shown illustrates the ozone generator technology over the years and compares conventional technology (CT) with Ozonía advanced technology (AT) with both oxygen and air feed gas.



UV

Microorganisms	UV-C inactivation @ 40mJ/cm ² dose
<i>Giardia Lamblia</i>	> 4 Log (>99,99%)
<i>Cryptosporidium Parvum</i>	> 4 Log (>99,99%)
<i>Escherichia Coli</i>	> 4 Log (>99,99%)
<i>Staphylococcus Aureus</i>	> 4 Log (>99,99%)
<i>Streptococcus Faecalis</i>	> 4 Log (>99,99%)
<i>Poliovirus Type 1</i>	> 4 Log (>99,99%)
<i>MS-2</i>	< 3 Log (<99,9%)
<i>Bacillus Subtilis</i>	< 2 Log (<99%)
<i>Adenovirus Type 40</i>	< 2 Log (<99%)

The UV germicidal effect is dependent on the dose measured in mJ/cm² which is the factor of the UV intensity and the irradiation time in the reactor chamber. It can be seen on the table that the germicidal reduction rate, at a given UV dose, is dependent on the species of micro-organism. For chlorine resistant micro-organisms, such as *Parvum* and *Giardia Lamblia*, these are easily inactivated with a low UV dose.

To optimize the UV dose and, consequently, the reactor efficiency, Ozonía uses advanced Computerized Fluid Dynamic modeling tools. The theoretical and C.F.D. results used by Ozonía are validated by independent third-party bio-dosimetry tests to obtain German DVGW, approval from the French ministry of health and American USEPA certification. UV represents one of the most cost effective (CAPEX and OPEX) technologies for disinfection applications.

MEMBRANES

This filtration technique involves passing water through porous and hollow fiber membranes. The membrane wall acts as a filter for all particles larger than 0.01 micron: pollen, algae, parasites, bacteria, viruses and large organic molecules. The fibers are bonded at the ends by a resin, which ensures perfect and permanent tightness of the module. In this way, the module prevents any contact between the raw and the ultra-filtered water. The result is perfectly pure water with a turbidity of lower than 0.1 NFU. Aquasource membranes are available in a large range of modules, from 1 to 140 m² of filtration surface area per module.

Materials	Cellulose triacetate or Hydrophilic polysulphone
Technology	Hollow fiber inside-out
Membrane cut-off	0.01 µm
Guaranteed turbidity	< 0.1 NFU
Bacteria & cyst removal	> 7 Log (>99,99999%)
Virus removal	> 6 Log (>99,9999%)
SDI	< 3



Aquaray® SLP-DW



Aquaray® H₂O



UF SKID



OZAT® CFV

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