

What's in US for you?  
TANGIBLE ENVIRONMENTAL & OPERATIONAL BENEFITS

DID YOU KNOW THAT...

- ...overall *Clean-in-Place* cycle time can be reduced by up to 30 minutes?
- ...total plant water use can be reduced by 10%?
- ...a large scale brewery can save at least \$100,000 annually in chemical consumables cost?

STREAMLINING PRODUCTION

In addition to environmental benefits and lower operational costs, overall Clean-In-Place cycle time can be improved:

- No final rinse – since ozone does not leave any by-products this phase can be avoided.
- The potent characteristics of ozone reduces disinfection time significantly.
- No oxidation of final product
- Cleaning phase can be enhanced which means lower cleaning agent demand.

LOWER CHEMICAL CONSUMPTION AND HANDLING

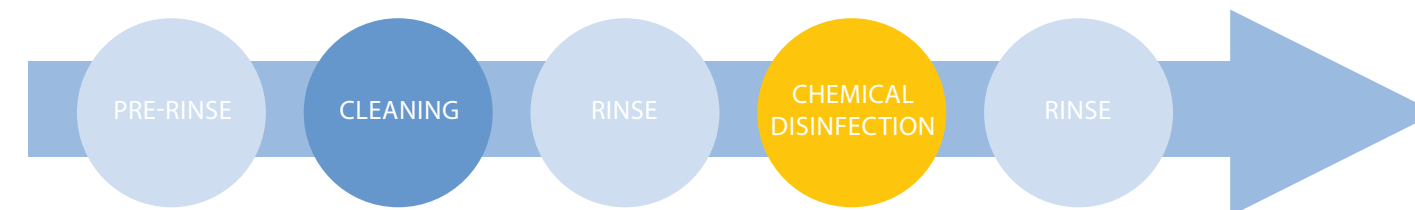
Ozone completely replaces traditional disinfection agents. Hazardous chemical handling, transport and operational costs can be reduced. Ozonated reuse water helps enhance caustic cleaning which further mitigates chemical consumption.

CUT ENERGY DEMAND

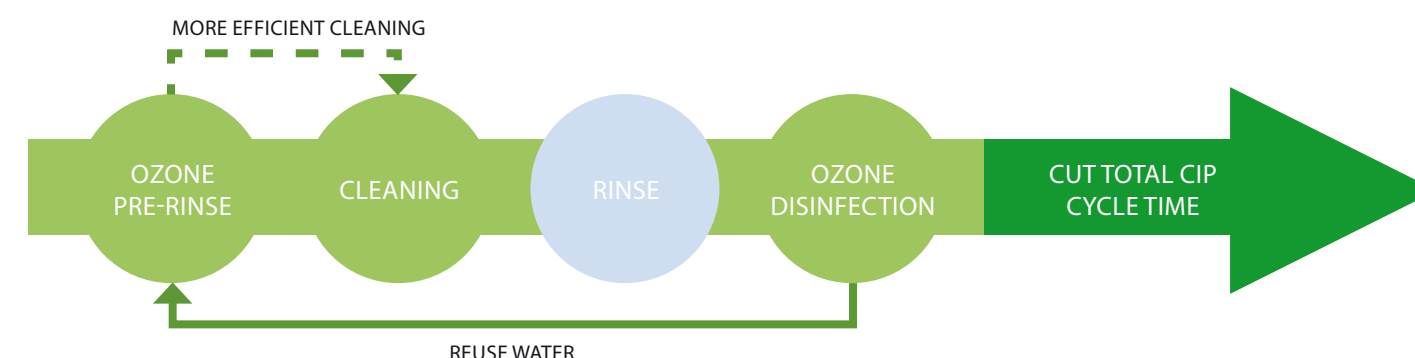
Due to effective cold disinfection, large amounts of energy can be saved which is normally used to heat hot water and steam. This makes ozone technology environmentally sound with respect to moving towards a more sustainable production.



TYPICAL CIP CYCLE



OZONETECH CIP-CYCLE



Ozonetech, started in 1993, offers a wide range of proprietary ozone generators for cleaning air and water, all produced in Sweden. In order to ensure the best possible functionality, we have an in house design and consultation team, as well as servicing and installation technicians.

We have many good references from a broad range of ozone use. Our products are used for restaurant exhausts, cleaning of exhaust ducts/minimising odours and recycling of heat, as well as for different kinds of odour problems, such as rotating heat exchangers for homes, grease traps, garbage rooms, swimming pools, remediation of toxic environmental waste, etc.



# Ozone technology in breweries



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RENA CIP™ FOR RELIABLE AND EFFICIENT TREATMENT AND DISINFECTION

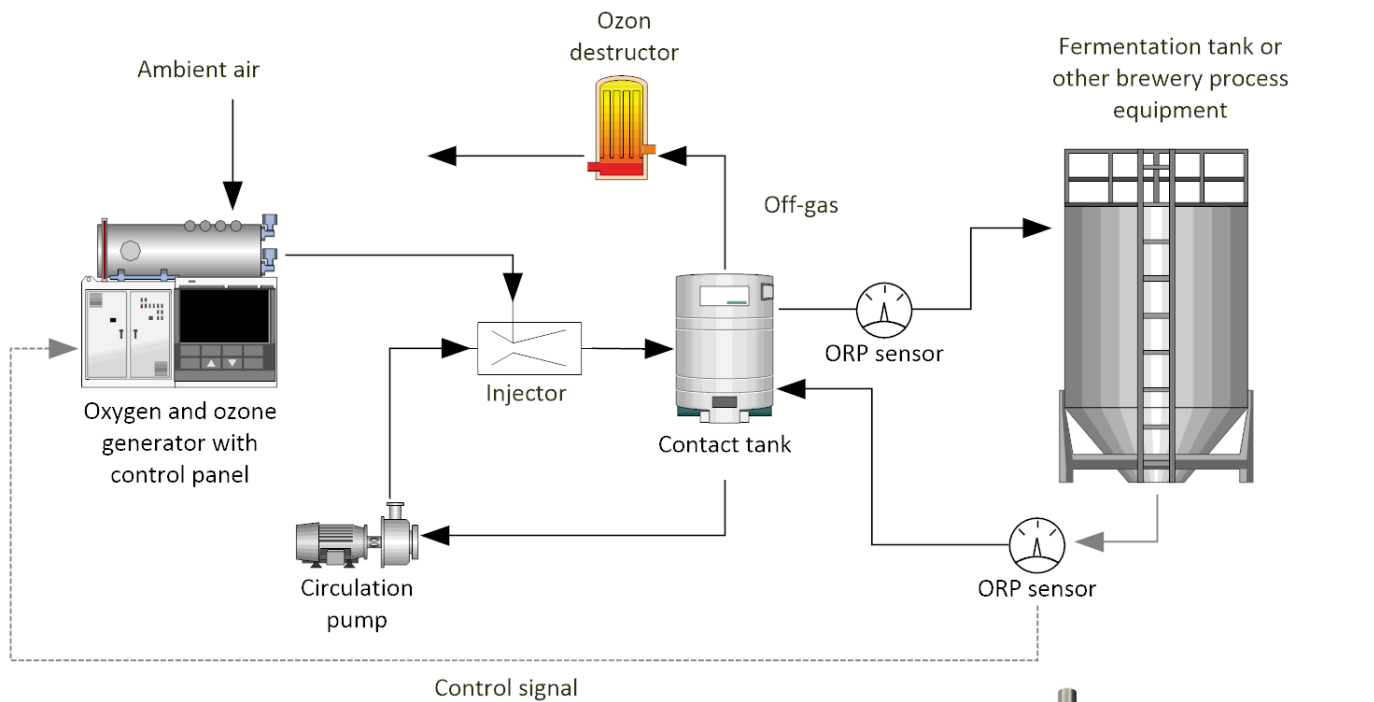
Ozonetech's solution is easily integrated into existing systems and is easy to maintain.

AN ADVANTAGEOUS METHOD FOR QUALITY ASSURANCE

Ozonetech efficiently solves the challenges of ensuring high quality process water and sanitizing mechanical filling machines.

THE MECHANISMS AND CHARACTERISTICS OF OZONE

Ozone is a powerful disinfectant and holds many advantages compared to traditional chemical disinfection agents.



OZONE PRODUCTION IN A CLOSED LOOP SYSTEM

1. Ozone gas is efficiently produced using dry and concentrated oxygen gas. It is controlled via in integrated control system with HMI.
2. A venturi injector dissolves the ozone gas into an internal circulating water stream.
3. Aqueous ozone is mixed in a contact tank. Any non-dissolved ozone gas is destroyed in a catalytic destructor to secure a controlled and safe working environment.
4. Ozonated water is fed to end user system and is monitored with an ORP or ozone sensor.
5. Brewery process equipment is treated by utilizing the high oxidation potential of ozone.
6. The CIP-return ozone content is monitored to continuously control ozone production and ensure adequate degree of treatment.



WATER QUALITY & FILLING LINES

Ozone technology can provide high quality water absent of any microorganisms and particles.

Aqueous ozone can also be used to efficiently sanitize bottles, cans or the mechanical filling equipment and does not leave any detrimental chemical by-products.

Ensure long durability and taste and at the same time lower the energy consumption compared to traditional hot water treatment, owing to the low application temperature of ozone.

REMOVE DISCOLORATION & UNWANTED AROMAS

The oxidizing capabilities of ozone effectively removes colors and aroma compounds absorbed by components such as seals and other wetted materials in mechanical equipment, vessels and pipes.

WATER AND WASTEWATER

Ozone leaves no unnatural residues after use, which means lower environmental load and new possibilities to recycle water. Ozone treatment offers significant water savings since no final rinse is required – natural oxygen is the only residue.

DID YOU KNOW THAT...

- ...at a large scale brewery, ozone technology can save up to 500,000 kWh annually compared to hot water disinfection in filling machines?
- ...ozone is an effective aroma and color removing agent – perfect for avoiding unwanted flavors and colors between batches?

WATER CIRCULATION SYSTEMS

For large facilities with closed circulating water and cooling systems, ozone is the optimal solution for maintaining a microbe-free environment:

- Avoid legionella outbreaks from cooling towers
- No corrosion thanks to applied ozone concentrations below 0.3 ppm
- Reduce blow-off due to natural break-down into oxygen only

IN-SITU PRODUCTION

Ozone is generated in-situ using only one natural ingredient—oxygen. This makes it a smart and environmentally friendly technique. A high voltage electrical field converts oxygen to ozone using technology called Corona Discharge.

Ozonetech's ozone systems generate high concentration ozone gas while using low amount of energy.

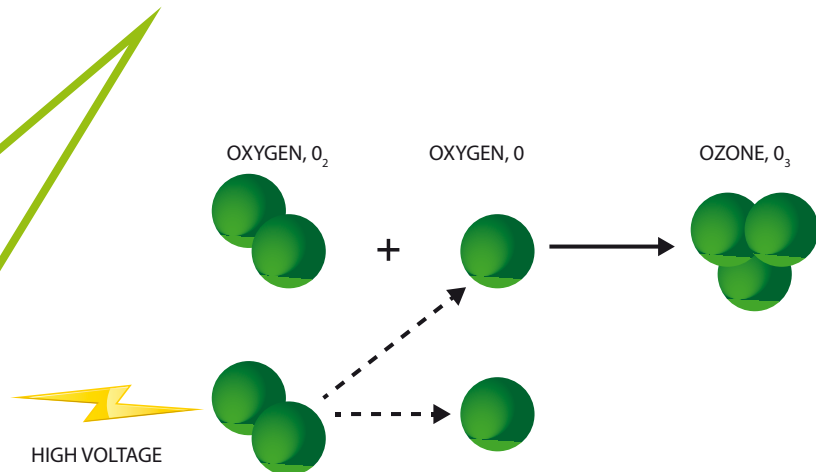
HIGH DISINFECTION CAPACITY

Ozone has an inherently high oxidation potential. Even at low concentrations, it offers significantly increased treatment capacity compared to typical disinfection agents.

This makes ozone treatment very effective against organic residues (such as fats and proteins) and breaking down cell walls and membranes of microorganisms.

DID YOU KNOW THAT...

- ...Ozonetech's RENA CIP only consumes 0.3 kWh of energy per Clean-in-Place cycle at a typical craft brewery?
- ...ozone is up to 2,500 times more effective than hypochlorite as a disinfectant?



OVERVIEW OF DISINFECTION AGENTS

Compound	Advantage	Challenges
Ozone	<ul style="list-style-type: none"><li>• Cold application</li><li>• Microorganisms cannot develop resistance</li><li>• Does not leave any harmful by-products</li><li>• No chemical handling</li><li>• Very low operational cost</li><li>• Gentle on all materials</li></ul>	<ul style="list-style-type: none"><li>• Separate mechanical installation</li></ul>
Hypochlorite	<ul style="list-style-type: none"><li>• Effectively breaks down organic compounds</li><li>• Microorganisms cannot develop resistance</li></ul>	<ul style="list-style-type: none"><li>• Corrosive</li><li>• Oxidizes copper vessels</li><li>• Requires rinsing after use</li><li>• Requires very clean surfaces before use</li></ul>
Peracetic acid	<ul style="list-style-type: none"><li>• High availability</li><li>• Leaves only a limited amount of by-products</li></ul>	<ul style="list-style-type: none"><li>• Limited durability</li><li>• Requires strict handling procedures</li><li>• Strong odor</li></ul>
Iodophors	<ul style="list-style-type: none"><li>• Effective disinfection</li></ul>	<ul style="list-style-type: none"><li>• Requires strict handling procedures</li><li>• Stains process equipment</li></ul>
Hot water and steam	<ul style="list-style-type: none"><li>• Effective disinfection</li></ul>	<ul style="list-style-type: none"><li>• High operational costs</li><li>• Time consuming</li></ul>