



**Moving Towards Green
and Sustainable Food
& Beverage Production
with Ozone Technology**

 ozonetech.

A METHOD FOR HIGH STANDARDS IN SANITATION

Ozonetech efficiently solves the challenges of ensuring high quality process water, sanitation of mechanical equipment and cooling systems.

Food and beverage industries face a number of challenges in order to move towards a greener and more sustainable production. Some of these comprise chemical consumption, water and energy.

Ozonetech aspires to take part in this development and offers an innovative technology that significantly affects the environmental footprint while improving end user profitability and product quality.

SANITATION OF PROCESS EQUIPMENT

Closed process equipment such as tanks and piping systems are in need of cleaning and disinfection to maintain high standards in terms of product quality and production environment.

The versatile characteristics of ozone makes it a viable alternative for removal of organic residues and completely eliminates the need for other traditional disinfection chemicals.

Traditional hot water or steam treatment to sanitize for example heat exchangers and valves can be avoided. Ozone provides this solution in all segments such as:

- Sauce production
- Dairy and milking systems
- Juice and beverage processing
- Handling of fresh cuts and spices

FILLING AND PACKAGING

To ensure post-production durability Ozonetech's system provides effective sanitation of packaging machines and food or liquid containers such as cans and bottles. This comprises filling of beverages, foods and sauces.

RINSING & CONVEYOR BELTS

During handling and processing of fresh produce, it is vital to avoid cross-contamination from process equipment and open surfaces. Oxygen is the only by-product of the break-down of ozone, making it an environmentally friendly method of sanitation to eliminate unwanted growth of harmful microorganisms.

Ozone can be used to rinse fresh foods to avoid spoilage and ensure product quality.

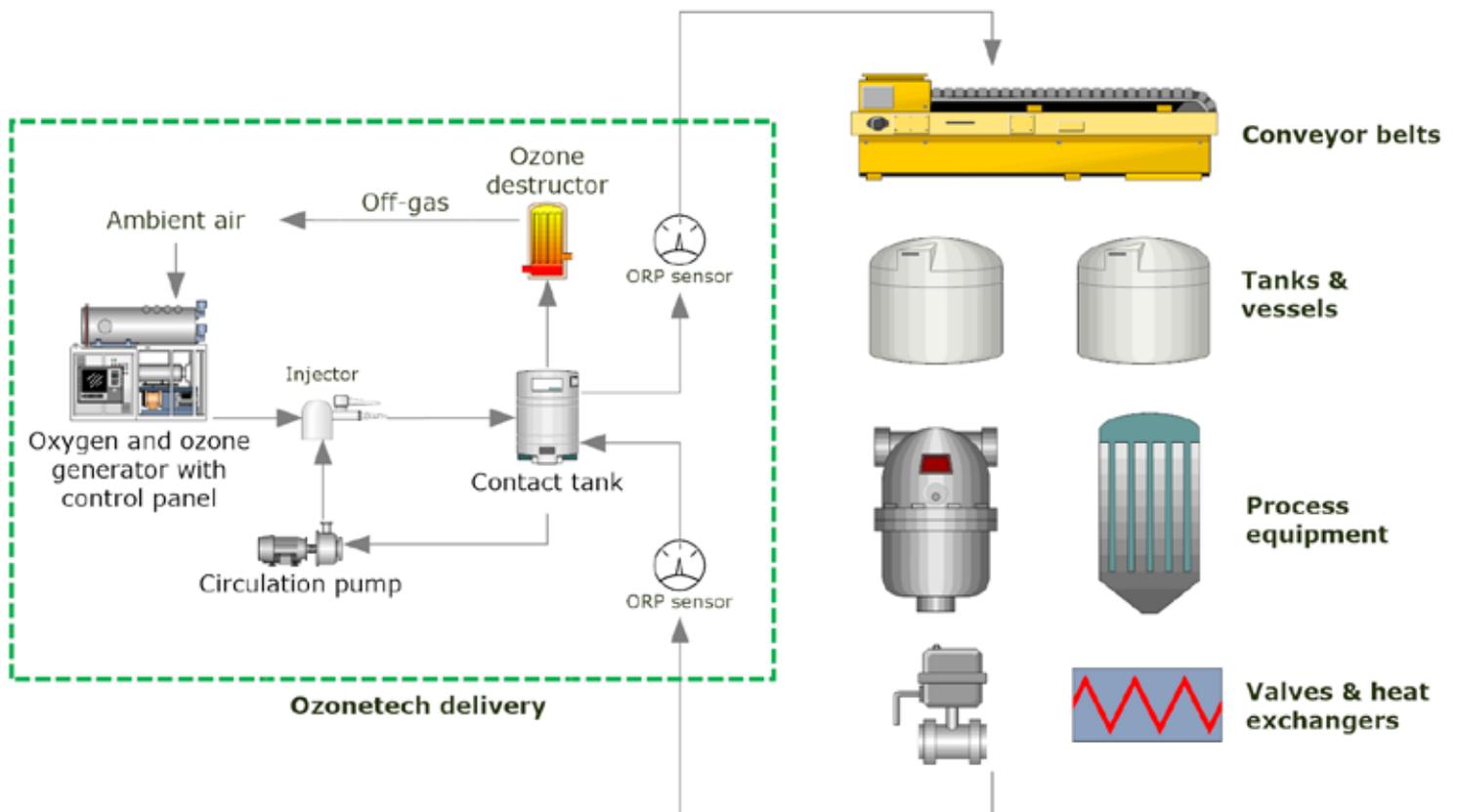
COOLING SYSTEMS

For facilities with large ice water cooling systems, Ozonetech's RENA CIP™ system is an effective solution which eliminated the growth of bacteria, mold and other microorganisms. This provides:

- Elimination of the risk of pathogenic outbreaks from cooling towers
- Avoid biofilm formation in the piping system and filters
- Very low operational cost
- No accumulation of chemicals or destruction costs



RENA CIP™ OFFERS RELIABLE AND EFFECTIVE CLEANING AND DISINFECTION



OZONE PRODUCTION IN A CLOSED CIRCULATING SYSTEM

- 1 Ozone gas is efficiently produced using an oxygen and an ozone generator. It is controlled via a PLC with touch panel.
- 2 A venturi injector dissolves the ozone gas into the circulating water stream.
- 3 Ozone gas-liquid transfer is maximized in a contact tank.
- 4 Ozone production is controlled using a desired set-point.
- 5 Process equipment is treated utilizing the unique properties of ozone.
- 6 The return stream ORP is monitored and used to continuously ensure adequate degree of treatment.
- 7 Any residual ozone gas is destructed to ensure a healthy working environment.



THIS IS HOW OZONE WORKS

Ozone is very effective and differs from traditional cleaning and disinfection chemicals which are used in all types of facilities in the food & beverage industry. Ozonetech offers novel technology and engineering to accommodate disinfection and sanitation needs.

TANGIBLE ADVANTAGES

Ozonetech's solution significantly reduces water and energy requirements during Clean-in-Place operations as well as chemical consumption and handling. This provides a healthier work environment and a lower environmental load.

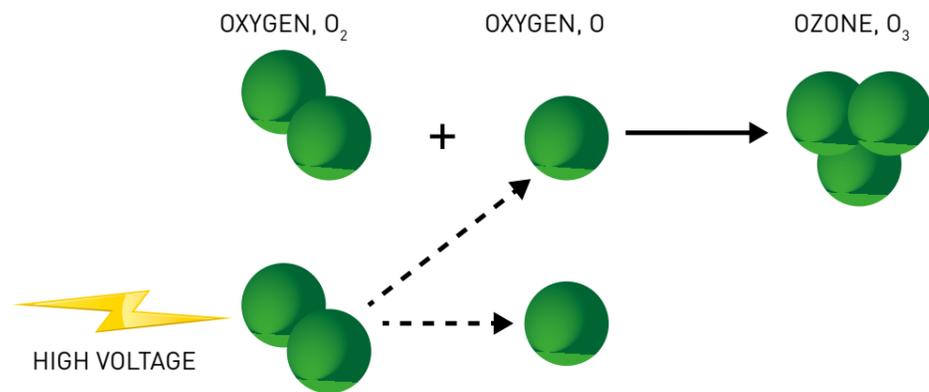
EFFECTIVE DISINFECTION

Ozone has an inherently high oxidation potential, a strong ability to oxidize compounds it comes in contact with. Therefore it is a very strong and effective disinfection agent by breaking down cell walls and membranes of microorganisms.

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 Corona Discharge technology.

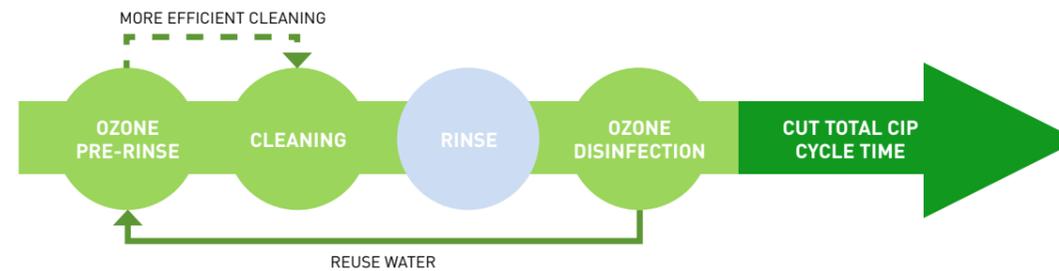
Ozonetech's ozone generators create high concentration oxygen gas while using low amount of energy.



TYPICAL CIP-CYCLE



OZONETECH CIP-CYCLE



LOWER CONSUMABLES COSTS

All currently used disinfection chemicals and associated costs can be eliminated.

When using ozone in combination with chemical cleaning agents, the same level of cleaning and disinfection can be achieved while lowering the chemical costs.

CUT ENERGY DEMAND

Ozone is applied cold, which means that large amounts of energy can be cut which is used to heat hot water or steam. This makes Ozonetech's system a smart choice with the environment and costs in mind.

WATER & WASTEWATER

Since ozone does not leave harmful by-products during or after disinfection, used water can be recycled for other process and cleaning phases. This means that large quantities of water can be saved. It also entails lower loads on wastewater treatment plants, lowering the environmental

STREAMLINE PRODUCTION AND GAIN CAPACITY

In addition to apparent environmental benefits and direct cost reduction, ozone technology provides lower downtime:

- No final CIP rinse is required since oxygen is the only by-product.
- Production capacity is increased. Ozone disinfection can be achieved in only 5-10 minutes.
- Total CIP cycle can be reduced by up to 30 minutes.
- By combining ozone with cleaning agents, the cleaning phase may be reduced.

OVERVIEW OF DISINFECTION AGENTS

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



About Ozonotech

Ozonotech is an award-winning cleantech company that has offered premium products for air and water treatment since 1993.

Our unique technology and extensive expertise has made us a rapidly growing global company with installations on six continents. All development and manufacturing is located in Sweden. In addition, we have in-house specialists for consultation, planning, installation and service.

As a Center of Excellence within air and water treatment, we also collaborate in international efforts to develop global standards for purification solutions.

At Ozonotech, we have a strong incentive to reduce energy consumption, health risks and the impact on the environment. Our current solutions provide a multitude of benefits in the processing and food industry, real estate, commercial kitchens as well as in the retail market.

For additional information, visit our website at www.ozonotech.com

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