



# OZONIA

## OZONE SYSTEMS

suez environnement

Degrémont

APPLICATIONS

# OVERVIEW

Ozone was first used by municipalities to improve the organic qualities of water with control of taste, odor and color as well as for its germicidal action. Application of ozone in wastewater treatment includes the destruction or removal of complex organic molecules, cyanides and phenols from chemical waste, etc. In addition, subjecting municipal wastewaters or combined municipal waste waters or combined municipal industrial waste waters to a final ozone process enables reuse for applications such as washwater, irrigation, or fire fighting systems. Ozone is also used extensively in industry in oxidation processes and for disinfection purposes. Typical examples are in the chemical industry where ozonolysis is necessary for the production of certain substances, in cooling towers/ systems where ozone replaces the less desirable chemical biocides, etc.

The high oxidation potential of ozone, which is 50% higher than chlorine, has prompted many companies to use Ozonia ozone equipment in their manufacturing facilities. In partnership with clients, Ozonia applies its knowledge in the field of ozone generation to achieve the best overall conditions (price, delivery, safety aspects) for all types of pilot or industrial plants. Either in its extensive laboratory resources or on the client's premises, Ozonia is in a position to demonstrate the advantages of a clean oxidation technology.

## OZONIA

Part of the Degremont group of companies and recognized for technical superiority, Ozonia's mission is to be the global leader in the application of disinfection and oxidation alternatives to meet the needs of the industrial and municipal markets. Ozonia designs and manufactures a wide range of Ultraviolet and Ozone equipment incorporating the most sophisticated electronics and lamp technologies available.

Our formula for success is fostering long-term customer satisfaction with technically advanced and cost-effective ultraviolet and ozone systems.

As a global corporation, human resources is one of our most important assets. At Ozonia, we continually encourage dialogue and exchange between our group companies, customers and affiliates to maintain a high level of personnel qualification in all fields.

## Drinking Water

It is an accepted fact that drinking water is disinfected when a residual of 0.4 mg/l of ozone has been maintained for 4 minutes. However, ozone has many additional benefits in the drinking water process:

- In preozonation, ozone improves clarification and avoids the transformation of organic material to haloforms. It also promotes the destruction of micro-organisms such as algae.
- Main ozonation treatment specifically breaks down trace contaminants and enhances the biodegradability of organic substances which are then removed in a biological treatment step.
- Finally, combined treatments 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 accidental contamination.

## Industrial

Ozone is the most economical agent for pulp bleaching processes avoiding the production of chlorinated compounds (AOX). Ozonia has committed major research efforts to this issue and is a leader in the field of large-scale optimized systems operating at high concentrations and pressures. Many pulp mills are producing ozone bleached pulp complying with the stringent standards imposed.

As with the pulp and paper industry, the chemical industry has sought new ways of improving productivity while using environmentally sound processes. Many of our customers started a care program some time ago and have determined that ozone is an excellent solution to their problems.

## Wastewater

The use of ozone in wastewater treatment is expanding and already includes the destruction or removal of:

- Complex organic molecules in order to improve biodegradability
- Pharmaceutically Active Compounds (PAC's) and endocrine disruptors
- Cyanides and phenols from chemical waste
- Odors from condensates/ wash-waters, which can then be recycled
- Color from dye works effluent, paper mills, etc.
- Surfactants, detergents from washing centers
- Odor elimination from urban wastewater plants or industrial flue gas

In addition, subjecting municipal wastewaters or combined municipal wastewaters or combined municipal industrial waste waters to a final ozone process enables reuse for applications such as washing, irrigation, or fire fighting systems.

## PRODUCT FOCUS: OZAT® CFS


### Equipment connections for:

- Cooling water (inlet & outlet)
- Feed gas inlet
- Ozone gas outlet

Main power board


Operating touch pad with display

Independent ozone generation modules with Ozonia patented non-glass dielectric

## PRODUCT FOCUS: OZAT® CFV

PLC control for all functions and logic

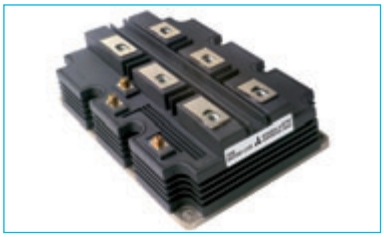
Power supplied with IGBT transistor

User-friendly operator interface with multilanguage selection

Factory mounted instrumentation for easy installation

# OZONE

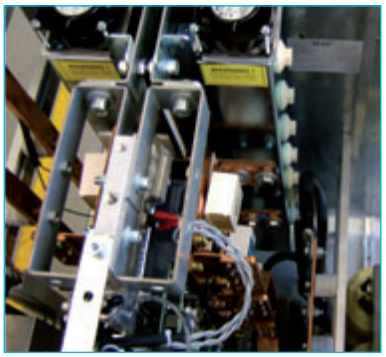
## PRODUCT FOCUS: MODIPAC™ power supply unit



Typical IGBT transistor module

Easy operator interface

Easy access to all electrical components



View inside the IGBT assembly

## PRODUCT FOCUS: OZFIL™ ozone generator system for bottle filling lines

In-line ozone injector system

Flow controller

Thermal Vent ozone destruct unit for environmental and safety compliance

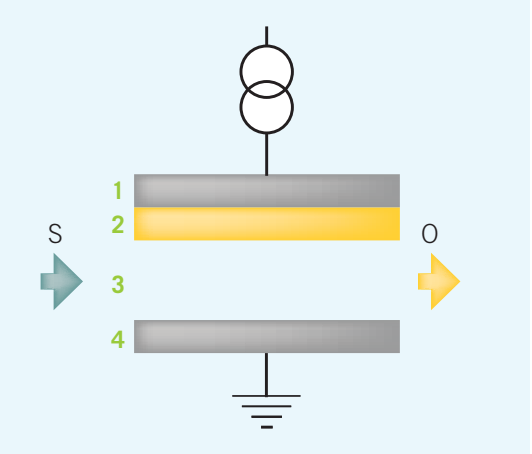
Repeatable and accurate residual ozone measurement for system control

TECHNICAL

# ACTION/THEORY

**The company and products**

Ozonia designs and manufactures from the smallest to the largest ozone generators in the world including ozone plants with capacities of several hundred kilos per hour. Ozonia offers unique professional expertise and decades of experience in ozone generation technology resulting in numerous developments such as IGBT medium frequency power supply unit and IGS™ dielectric technology. MEMBREL® electrolytic cells for pure water systems extends the range of Ozonia products and services. With thousands installations around the world, Ozonia offers unparalleled international experience.



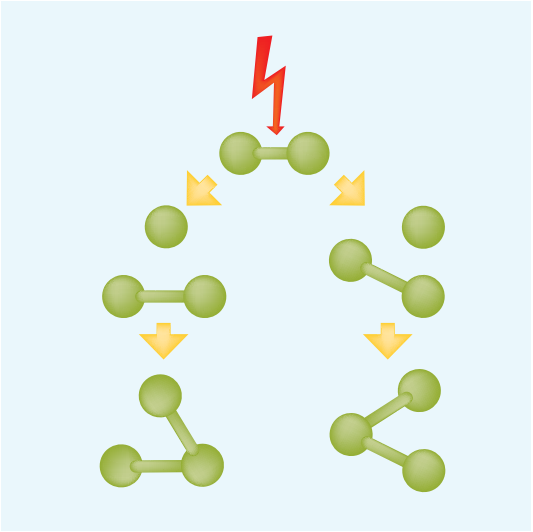

S Feed gas (oxygen or air)
O Gas containing ozone

1 HV electrode
2 Dielectric
3 Discharge gap
4 Earth electrode

# HOW DOES IT WORK?

**Large-scale ozone generation by dielectric barrier discharge**

Ozone is produced on a commercial-scale by means of silent electrical discharge - the result of a high voltage alternating field acting between two electrodes separated by a dielectric and a narrow gap. The feed gas, usually air or oxygen, flows through the narrow gap across which the discharge occurs. The ozone generator's electrodes are two concentric tubes, an outer tube made of stainless steel and an inner electrode formed by a layer of metal on the inside of a dielectric.



Ozone is formed by splitting oxygen molecules ($O_2$) into atomic oxygen (O), which then recombine with other oxygen molecules to produce ozone molecules ($O_3$).

## Product Focus/ Performances

- → IGS™ dielectrics
- → Optimized mechanical design
- → State-of-the-art IGBT power supply
- → Low harmonic current rejection
- → Low power consumption
- → High ozone concentration
- → Robust industrial quality
- → Compact dimensions
- → User friendly interface
- → Larger units with optional bus
- → Low maintenance
- → High performance

# OZONE

## PRODUCT RANGE

### MAIN FEATURES

| |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
| | LAB 2B | TOGC 2 | TOGC 8 & 13 | MEMBREL® | OZAT® CFS | OZAT® CFV air | OZAT® CFV $O_2$ | XF™ |
| **Description** | Ozone generator | Ozone generator | Ozone generator + oxygen concentrator | Ozone generator | Ozone generator | Ozone generator | Ozone generator | Ozone generator |
| **Ozone production with air** | 4 g/h | 4 g/h | - | 3 to 9 g/h | 2 to 25 ppd | 40 to 476 ppd | - | - |
| **Ozone production with $O_2$** | 10 g/h | 10 g/h | 8 & 13 g/h | - | 3 to 39 ppd | - | 63 to 794 ppd | 1270 to 5160 ppd |
| **Fully assembled** | x | x | x | x | x | x | x | - |
| **Fully tested** | x | x | x | x | x | x | x | - |
| **Completion on-site** | - | - | - | - | - | - | - | x |
| **Containerised version** | - | - | - | - | x | x | x | x |
| **CE & US versions** | - | - | - | - | x | x | x | x |
| **SS enclosure option** | - | - | - | - | x | x | x | - |
| **Remote control** | - | - | x | x | x | x | x | x |

### MAIN APPLICATIONS

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Drinking water** | - | x | x | - | x | x | x | x |
| **Waste treatment** | - | x | x | - | x | x | x | x |
| **Cooling water** | - | x | x | - | x | x | x | - |
| **Bottled water** | - | x | x | - | x | x | x | - |
| **Pure water** | - | - | x | x | x | - | x | - |
| **Pulp and paper** | - | - | - | - | - | x | x | x |
| **Pharmaceutical** | - | - | - | x | x | - | x | - |
| **Semi-conductor** | - | - | - | x | x | - | x | - |
| **Education / R&D** | x | - | - | - | x | - | - | - |
| **TOC reduction** | - | - | x | - | x | x | x | - |
| **COD reduction** | - | - | - | - | x | x | x | x |

INTELLIGENT GAP SYSTEM

OZONE

HIGH OZONE CONCENTRATION

## MAIN FEATURES

| |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| | **OZFIL™** | **MODIPAC™** | **IK™** | **ODT™** | **RB™** | **Dome diffusers** |
| **Description** | Ozone generator | Power Supply Unit | Ozone destruction | Ozone destruction | Ozone destruction | Ozone diffuser |
| **Ozone production with air** | 37 to 115 g/h | - | - | - | - | - |
| **Ozone production with $O_2$** | - | - | - | - | - | - |
| **Fully assembled** | X | - | X | X | X | - |
| **Fully tested** | - | - | X | X | X | - |
| **Completion on-site** | - | - | - | - | - | - |
| **Containerised version** | - | X | - | - | - | - |
| **CE & US versions** | X | X | - | - | - | - |
| **SS enclosure option** | X | - | - | - | - | - |
| **Remote control** | - | X | X | X | X | - |

## MAIN APPLICATIONS

| | | | | | | |
|---|---|---|---|---|---|---|
| **Drinking water** | X | X | X | X | X | - |
| **Waste treatment** | - | X | - | X | X | X |
| **Cooling water** | - | - | - | - | - | - |
| **Bottled water** | X | - | - | - | - | - |
| **Pure water** | - | - | - | X | - | - |
| **Pulp and paper** | - | X | - | | X | - |
| **Pharmaceutical** | - | - | - | X | - | - |
| **Semi-conductor** | - | - | - | - | - | - |
| **Education / R&D** | - | - | - | - | - | - |
| **TOC reduction** | - | X | X | X | X | X |
| **COD reduction** | - | - | - | - | - | X |

IGBT POWER TRANSISTORS

# OZONE

ENVIRONMENTALLY FRIENDLY

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