



**OZONIA**  
**OZONE**  
**SYSTEMS**



### 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 waste water treatment includes the destruction or removal of: complex organic molecules, cyanides and phenols from chemical waste, etc. In addition, subjecting municipal waste waters or combined municipal waste waters or combined municipal industrial waste waters to a final ozone process enables reuse for applications such as wash-water, 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.

### ➤ Municipal...

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.



### Municipal/Industrial...

The use of ozone in waste water 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 waste water plants or industrial flue gas

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



### ➤ 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 optimised systems operating at high concentrations and pressures. Many pulp mills are producing ozone bleached pulp complying with the high 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.

## ACTION / THEORY

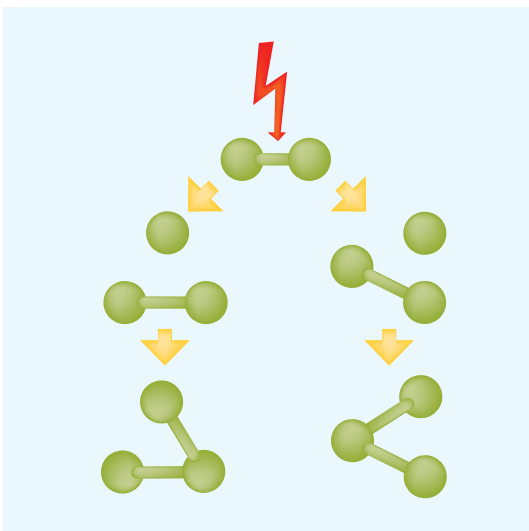
### The company and products

Ozonia designs and manufactures the largest ozone generators in the world and realises turnkey ozone plants with capacities of several hundred kilos per hour with an in-house IGBT medium frequency power supply unit and IGS™ dielectric technology. Ozonia offers a unique professional expertise and over thirty years of experience in ozone generation. A widely proven and reliable medium frequency technology results in very high ozone yields from both oxygen and air. MEMBREL® electrolytic cells for pure water systems extends the range of Ozonia's ozone products and services. With thousands installations around the world, several of them over 250 kg/h, Ozonia offers real international experience.

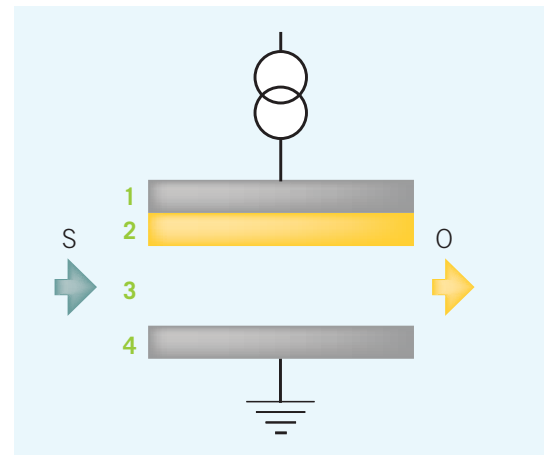
## HOW DOES IT WORK?

### 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 where 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. The metal electrode is cooled by water flowing around the outside of it. The ozone generator is essentially a drum-like vessel containing many such electrode pairs, and outwardly resembles a heat ex-changer.



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



- 1 HV electrode
  - 2 Dielectric
  - 3 Discharge gap
  - 4 Earth electrode
- S Feed gas (oxygen or air)  
O Gas containing ozone







## Product Focus/ Performances

- IGS™ dielectrics
- Optimised 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	MEMBREL®	TOGC 8, 13 & 45	OZAT® CFS	OZAT® CFV air	OZAT® CFV O <sub>2</sub>	XFTM
Description	Ozone generator	Ozone generator	Ozone generator	Ozone generator + oxygen concentrator	Ozone generator	Ozone generator	Ozone generator	Ozone generator
Ozone production with air	4 g/h	4 g/h	3 to 9 g/h	-	37 to 470 g/h	0.75 to 9 kg/h	-	-
Ozone production with O <sub>2</sub>	10 g/h	10 g/h	-	8 to 45 g/h	53 to 690 g/h	-	1.3 to 26 kg/h	24 to 250 kg/h
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
SS enclosure option					X			
Remote control			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			
Food		X		X	X	X	X	
Aquaculture		X		X	X	X	X	
Pure water			X					
Pulp and paper								X
Pharmaceutical			X			X	X	
Semi-conductor			X			X	X	
Education / R&D	X							
TOC reduction				X	X			
COD reduction					X	X	X	X

## INTELLIGENT GAP SYSTEM

# OZONE

## HIGH OZONE CONCENTRATION

## MAIN FEATURES

							
	<b>OZSKID / OZFIL™</b>	<b>MODIPACT™</b>	<b>IK™</b>	<b>ODT™</b>	<b>RBT™</b>	<b>Dome Diffusers</b>	<b>Radial Diffusers</b>
<b>Description</b>	Ozone generator	Power Supply Unit	Ozone destruction	Ozone destruction	Ozone destruction	Ozone diffuser	Ozone diffuser
<b>Ozone production with air</b>	37 to 112 g/h	-	-	-	-	-	-
<b>Ozone production with O<sub>2</sub></b>	-	-	-	-	-	-	-
<b>Fully assembled</b>	<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>		
<b>Fully tested</b>			<b>X</b>	<b>X</b>	<b>X</b>		
<b>Completion on-site</b>							
<b>Containerised version</b>		<b>X</b>					
<b>SS enclosure option</b>	<b>X</b>						
<b>Remote control</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>		

## MAIN APPLICATIONS

<b>Drinking water</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Waste treatment</b>		<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Cooling water</b>			<b>X</b>	<b>X</b>	<b>X</b>		
<b>Bottled water</b>	<b>X</b>			<b>X</b>			
<b>Food</b>	<b>X</b>			<b>X</b>			
<b>Aquaculture</b>	<b>X</b>			<b>X</b>			<b>X</b>
<b>Pure water</b>							
<b>Pulp and paper</b>		<b>X</b>			<b>X</b>		<b>X</b>
<b>Pharmaceutical</b>			<b>X</b>	<b>X</b>	<b>X</b>		
<b>Semi-conductor</b>			<b>X</b>				
<b>Education / R&amp;D</b>			<b>X</b>	<b>X</b>			
<b>TOC reduction</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	
<b>COD reduction</b>			<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

# IGBT POWER TRANSISTORS

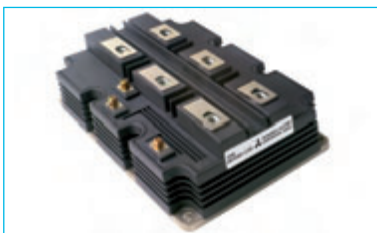
# OZONE

## ENVIRONMENTALLY FRIENDLY



# OZONE

## PRODUCT FOCUS: MODIPAC™ power supply unit



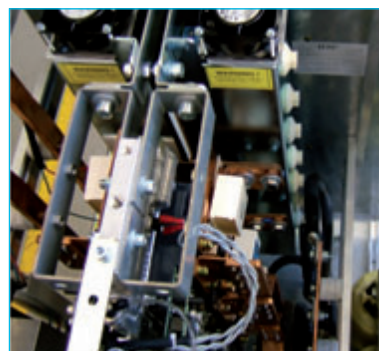
Typical IGBT transistor module



IGBT cooling water equipment



Internal arrangement



View inside the IGBT assembly

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



Inline ozone injector system



Vent ozone destruct unit



Flow controller



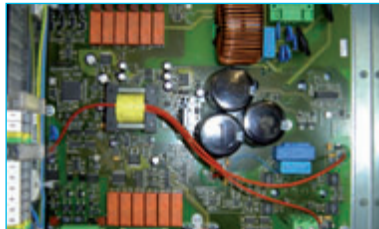
Residual ozone measurement

## PRODUCT FOCUS: OZAT® CFS



### Equipment connections for:

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



Main power board for rectification and inversion



Operating touch pad with display



Ozone generation module showing the HV, cooling water and gas connections

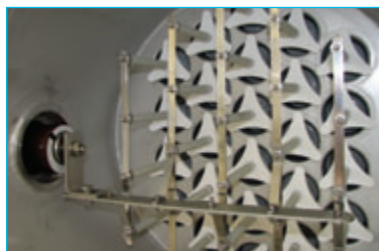
## PRODUCT FOCUS: OZAT® CFV



PLC unit installed in the OZAT® CFV unit



IGBT transistor water cooling system



Dielectric connections with fuses



Integral piping mounted on the OZAT® skid

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