



OZONE



OZONIA

DISINFECTION  
OXIDATION

# 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 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.

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.

## 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.

## WASTE WATER

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

## 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.



## ACTION / THEORY

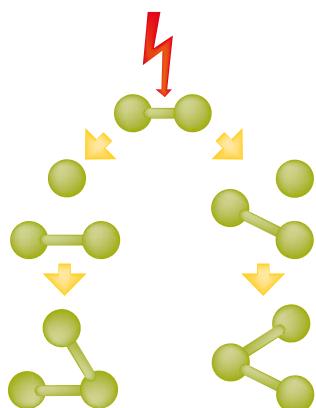
### The company and products

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 IGST™ 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.

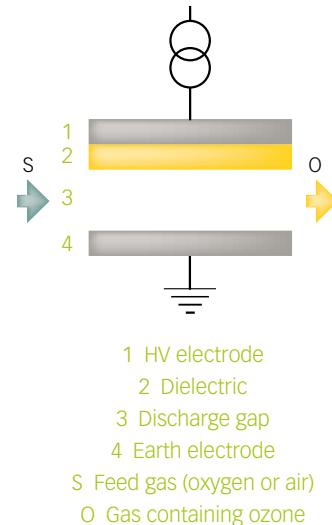
## HOW DOES IT WORK?

### 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 exchanger.



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

- > IGST™ 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

# PRODUCT RANGE

Ozone  
IGST<sup>TM</sup> Technology  
High Ozone concentration

								
FEATURES	LAB 2B	TOGC 2	MEMBREL <sup>®</sup>	TOGC 8, 13 & 45	OZSKID / OZFIL <sup>™</sup>	OZAT <sup>®</sup> CFS	OZAT <sup>®</sup> CFV air/O <sub>2</sub>	XFT <sup>™</sup>
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 – 9 g/h	-	37 – 112 g/h	37 – 470 g/h	0.75 – 9 kg/h	-
Ozone production with O <sub>2</sub>	10 g/h	10 g/h	-	8 – 45 g/h	-	53 – 690 g/h	1.3 – 26 kg/h	24 – 250 kg/h
Fully assembled	x	x	x	x	x	x	x	
Fully tested	x	x	x	x		x	x	
Completion on-site								x
Containerised version							x	x
SS enclosure option					x	x		
Remote control			x		x	x	x	x
<b>APPLICATIONS</b>								
Drinking water		x		x	x	x	x	x
Waste treatment		x		x		x	x	x
Cooling water		x		x		x	x	
Bottled water		x		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	
Semi-conductor			x				x	
Education / R&D	x							
TOC reduction				x		x		
COD reduction						x	x	x

# Auxiliary equipments

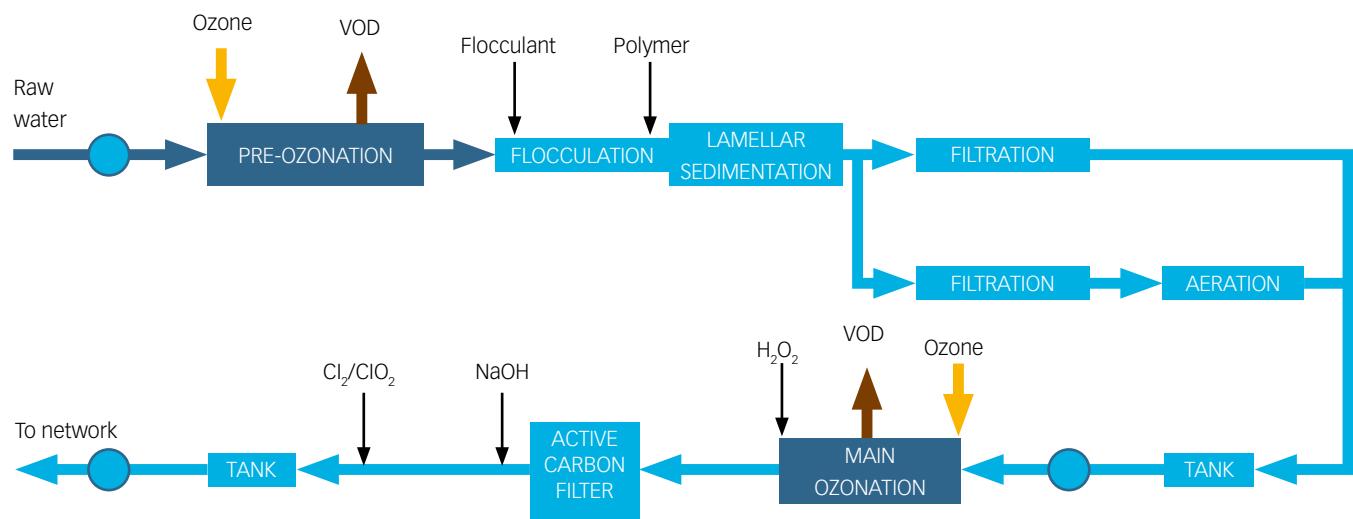
## IGBT power transistors

### Environmentally friendly

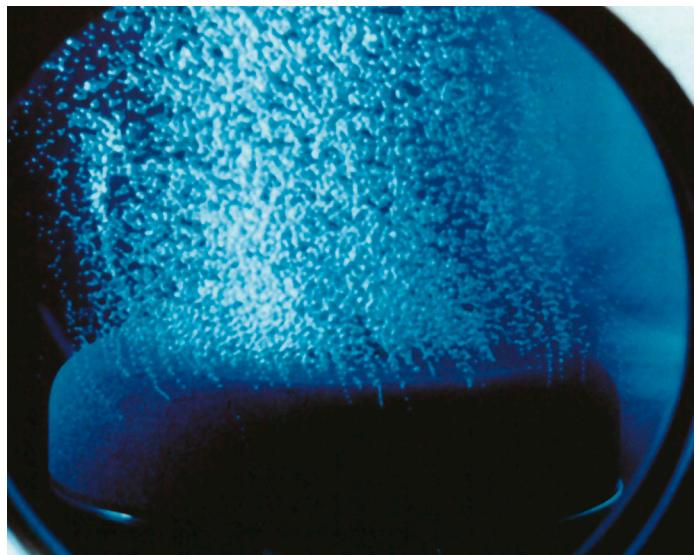
						
FEATURES	MODIPAC™	IK™	ODT™	RB™	DOME DIFFUSERS	RADIAL DIFFUSERS
Description	Power Supply Unit	Ozone destruction	Ozone destruction	Ozone destruction	Ozone diffuser	Ozone diffuser
Ozone production with air	-	-	-	-	-	-
Ozone production with O <sub>2</sub>	-	-	-	-	-	-
Fully assembled		X	X	X		
Fully tested		X	X	X		
Completion on-site						
Containerised version	X					
SS enclosure option						
Remote control	X	X	X	X		
<b>APPLICATIONS</b>						
Drinking water	X	X	X	X	X	X
Waste water	X		X	X	X	X
Cooling water		X	X	X		
Bottled water			X			
Food			X			
Aquaculture			X			X
Pure water						
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	X	
COD reduction		X	X	X	X	X

# TREATMENT LINE

## SAMPLE TREATMENT LINE FOR DRINKING WATER



Typical large ozone plant



Porous diffuser in operation

## SKILLS AND EXPERTISE

### Engineering

Ozonia offers a unique professional expertise and over thirty years of experience in ozone generation. A proven state-of-the-art medium frequency Advanced Technology combined with revolutionary dielectric materials results in very high ozone yields. In addition to top-of-the-line ozone generation equipment, Ozonia offers clients unrivalled ozone application technology for all types of processes. In addition to the classic engineering disciplines, Ozonia is also in the position to assist operators with HAZOP studies.



### Quality Management

Ozonia operates a Quality Management System covering all aspects of business activity. The system is supervised by a QA manager and is subject to regular internal audits and annual certification by the company Bureau Veritas.



### Installation, Commissioning & Training

Following the purchase phase clients can avail themselves of the Ozonia after-sales services. These services cover: installation, installation supervision, installation inspection, commissioning and on-site training of the operator's personnel. Additionally, Ozonia can organise training workshops in a classroom environment for larger groups.



### Plant Service & Maintenance

Having placed their trust in Ozonia's equipment, it is only logical that clients expect a professional and competent after-sales service plus technical assistance in cases of emergencies. Ozonia has the structure to ensure that clients get the best support. The services offered range from a hot-line breakdown services to regular plant service contracts – everything to ensure that our clients get the best from our equipment.

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