

A close-up photograph of a green leaf with several water droplets of varying sizes. The droplets are clear and reflect light, creating bright highlights. The leaf's surface is textured and shows some veins. In the top left corner, there is a blue circular graphic containing the text 'PROCESS APPLICATIONS'. In the bottom right, there is a white cloud-like graphic containing the company name and treatment technologies.

**PROCESS  
APPLICATIONS**

**OZONIA**

CUSTOMIZED TREATMENT  
SOLUTIONS WITH

**O<sub>3</sub> - UV - AOP**

„THE ANSWER TO AN ECOLOGICALLY AWARE WORLD“

TREND-SETTING, EFFICIENT, SUSTAINABLE

In its interaction with nature modern society is exposed daily to challenges with low to high complexity. Anthropogenic effects on nature are omnipresent and reflect human action – climate change, worldwide population growth and environmental pollution are facts in the focus of the worlds public view that challenge science and technology every day. Ozone, ultraviolet light (UV) as well as AOP are well known technologies that have been successfully applied to water treatment for decades.

Without these modern water treatment is no more thinkable, when disinfection or removal of pollutants from our drinking water resources or waste waters are concerned. Only integrated approaches, that besides available best technologies also consider energy efficiency as well as ecological considerations, will be trend-setting and therefore provide us with sustainable solutions for a bright future.

GROWING AWARENESS OF EMERGING CONTAMINANTS

There’s an increasing attention to the negative impact of micro-pollution on the water ecosystem. Innumerable organic micro-pollutants are present as trace elements or in miniscule amounts in wastewater and only between 100 and 1,000 have been identified by studies of the 100,000 substances currently in use in industry, agriculture and for domestic purposes. Even if the amount of these compounds in water is rather low, some of them can have a definite impact on aquatic organisms even at very low doses.

LOW EFFECTIVENESS OF CONVENTIONAL TREATMENT STEPS

In the coming years, legislation around the world will be tightened with regard to water pollutants in municipal and industrial waste waters and to the discharge of organic substances into surface waters.f:

ADDITIONAL TREATMENT STEPS WILL BE REQUIRED

Thanks to their high oxidation performances, oxidation processes are highly effective in the removal of persistent organics and in breaking up a wide variety of compounds. Alternative solutions using oxidative treatment will be increasingly used to comply with the current and upcoming environmental regulations.



CONTAMINATION

- > COD
- > TOC
- > MTBE
- > 1,4 DIOXAN
- > NDMA
- > PHARMACEUTICALS
- > PESTICIDES
- > EDC's
- > INDUSTRIAL CHEMICALS
- > PCP's
- > FRAGRANCES
- > SOLVANTS & TENCIDES
- > TASTE, ODOUR, COLOUR
- > ...

„COUNTLESS APPLICATIONS IN NUMEROUS MARKETS“

FROM THE USE IN DRINKING WATER TO CHLORINE FREE PULP BLEACHING

Ozone, UV and AOP based processes are today already used in numerous applications. Drinking water treatment with e.g. ozone has been applied for decades providing us with well tasting, colorless crystal clear water. In the last decades ozone , UV and AOP based processes have become a solution for more complex processes also, for example for waste water treatment, the food industry or for soil remediation processes. All these processes have in common that typically the client benefits from more than one effect that makes the processes more and more attractive. Besides the well known use in water treatment applications ozone is also applied in e.g. pulp bleaching, chemical synthesis and flue gas cleaning.

MULTIPLE EFFECTS

When oxidative technologies are applied in water treatment or other applications, several different effects can be observed. Typically more than one effect can be realized providing additional benefits.

APPLICATIONS

- > DRINKING WATER TREATMENT
- > MUNICIPAL WASTE WATER TREATMENT
- > INDUSTRIAL WASTE WATER TREATMENT
- > Cl<sub>2</sub> FREE BLEACHING PROCESSES
- > CHEMICAL SYSNTHESIS
- > PROCESS WATER TERAETMENT
- > SOIL REMEDIATION
- > AQUACULTURE
- > SWIMMING POOLS & SPA'S
- > ...

		LEISURE				COMMUNAL				INDUSTRIAL										
		SWIMMING POOLS & PARKS	AQUARIUMS	SPAS & THERMAL SPAS	WATER PARKS	WASTE WATER	HOSPITAL WASTE WATER	DRINKING WATER	LANDFILL LEACHATE	FOOD	REMEDIATION	BALLAST WATER	AQUACULTURE	WASTE WATER1	BOTTLING	COOLING WATER	ULTRAPURE WATER	WATER REUSE	PROCESS WATER	OTHER APPLICATIONS
WATER	DECOLORISATION	●	●	●	●	◆	◆	●	◆					◆				◆	●	
	DISINFECTION	●	●	●	●	◆	◆	●		●		●	●	◆	●	●	●	●	●	
	MANGANESE AND IRON REMOVAL							●							●					
	ODOUR ELIMINATION	●	●	●	●	◆	◆	●	◆	◆			◆	◆				◆		
	TASTE							●												
	IMPROVEMENT FLOCCULATION							●					●							
	COD REDUCTION	◆	◆	◆	◆	●	●	◆	●				◆	●		●	●	●	●	
	REMOVAL OF MICRO-POLLUTANTS (Endocrine active substances, Phar- maceutical compound, Pesticides,...)					●	●	●	●		●			●				●		
	REMOVAL OF SPECIFIC POLLUTANTS (Phenols, Tensides, AOX, Toxins, ...)					●	●	●	●		●			●				●		
OTHERS	SLUDGE REDUCTION					●							●					●		
	BLEACHING (Pulp and Kaolin)																			●
	OZONOLYSIS / SYNTHESIS																			●
	EMISSION CONTROL (H <sub>2</sub> S, NOx in flue gases)					●							●							●



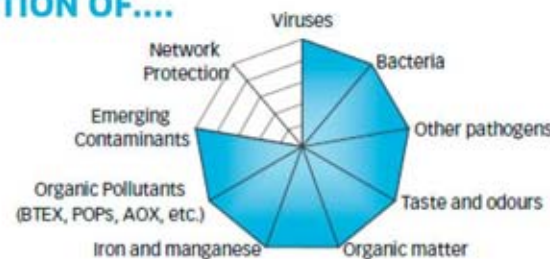
## „COMPLETE PORTFOLIO OF PROCESSES“

### OZONE, UV AND ADVANCED OXIDATION PROCESSES (AOP)

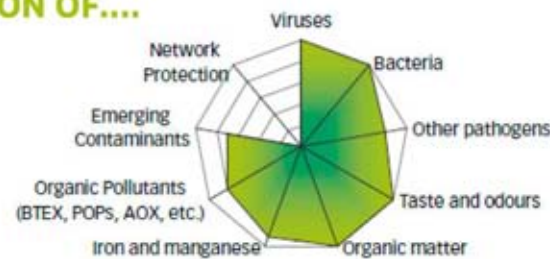
Depending on the nature of a contamination or the treatment target defined the one or other process may be applied. In principle the more resistant or stable a contaminant, the stronger the oxidation potential has to be. OH Radicals produced in AOP processes with either  $O_3 + H_2O_2$

or  $UV + H_2O_2$  are by far the strongest oxidation agents in water treatment with much improved reaction kinetics. OZONIA offers the complete range of technologies and provides complementary services for the selection and design of the right process.

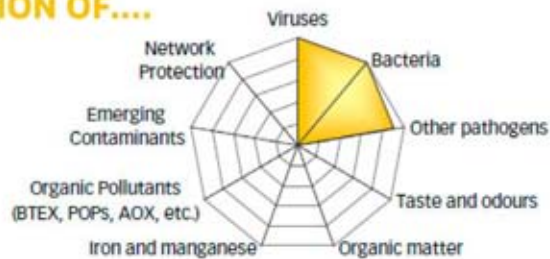
#### AOP BASED PROCESSES FOR THE ELIMINATION OF....



#### O<sub>3</sub> BASED PROCESSES FOR THE ELIMINATION OF....



#### UV BASED PROCESSES FOR THE ELIMINATION OF....



## THE LEADER IN DISINFECTION & OXIDATION PROCESSES

Ozonia is the global leader in the application of disinfection and oxidation alternatives. Ozonia designs and manufactures a wide range of Ultraviolet, Ozone and Advanced Oxidation Process (AOP) equipment incorporating the most sophisticated electronics and lamp technologies available to meet the needs of the industrial and municipal markets. Our formula for success is fostering long-term customer satisfaction with technically advanced and cost-effective ultraviolet, ozone and AOP systems..

### OZONE GENERATORS

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. With thousands installations around the world, Ozonia offers unparalleled international experience. Breakthrough innovation like IGSTM dielectric technology or MEMBRELO® electrolytic cells for pure water systems have revolutionized the ozone generation field.

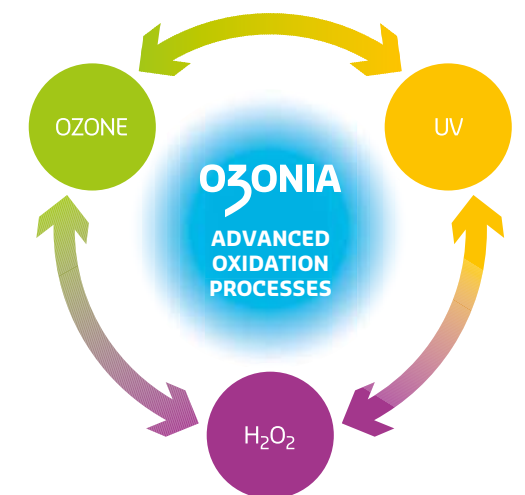
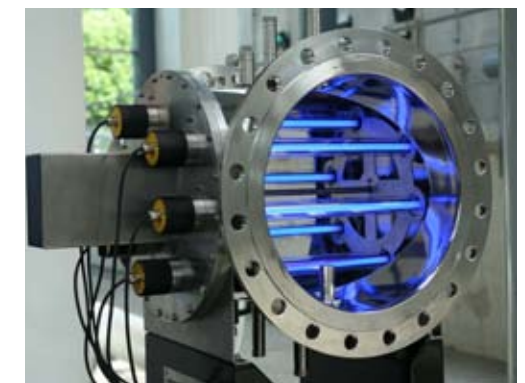
### UV SYSTEMS

Ozonias Aquaray® UV systems are a comprehensive range including closed vessels reactors & open channel modules. For the past 20 years, Aquaray® UV disinfection systems have been used successfully to eliminate hazardous and environmentally unacceptable chemicals such as chlorine and other associated disinfection by-products. Ozonia offers UV products for municipal wastewater, municipal drinking water and industrial applications.

### AOP SYSTEMS

Because complex problems require radical solutions, Ozonia designs and develops AOP systems to generate high oxidation performances. The reactive species formed by AOP are the hydroxyl radical whose high standard oxidizing reduction potential ensures the degradation of the more persistent organic pollutants found in water. According to customer requirements, Ozonia supplies the most adapted AOP system based on the following oxidants combinations:

- $O_3 / UV$
- $O_3 / H_2O_2$
- $UV / H_2O_2$



## “BENEFIT FROM OUR EXPERTISE!”

### PATHWAY TO YOUR APPLICATION

O3, UV und AOP based processes are well known efficient solutions in water treatment and other applications. The questions if and how these technologies are suitable to be applied is answered on base of expertise, lab testing as well as on site pilot testing. OZONIA process experts play an important role within this process: from a first evaluation of feasibility of a process in question over planning and execution of trails up to the realization of a large scale plant. In combination with a well equipped laboratory with relevant analytics and a portfolio of different mobile pilot plants as well as highly qualified personal, we guide you through all phases of your project.

### THE BASE: COMPREHENSIVE EXPERTISE

OZONIA is global leader in ozone and UV generating technologies. The requirements of our clients exceed this technological leadership. Expertise around water treatment and the use of oxidative or UV processes is our strength! OZONIA employs a team of experts with many years of experience in the fields of water and waste water treatment for municipal and industrial clients. Comprehensive scientific databases and experience from our own projects as well as research programs are the basis for a comprehensive and qualified consultancy.

### LABORATORY TESTS AND ANALYTICS

OZONIA maintains several laboratories around the world. Multi-functional test stands allow the simulation of any combination of the available technologies O3 - O3 / UV - O3 / H2O2 - UV / H2O2 - UV / O3 / H2O2 The scope ranges from simple batch to semi continuous test set-ups that allow the simulation of a wide spectrum of processes. Relevant analytics of sum parameters and analysis of single components allow the simulation of an analogous large scale treatment process:

### ON-SITE PILOTING

The final implementation of a pre-selected process in many cases require under real conditions, i.e. on site. Only then e.g. fluctuation of flow, contaminant concentration and quality, COD load etc. can be assessed accordingly. Ozonia has great experience in the conduction of on site pilot tests and is specialized in the customization of client needs.



### SERVICES

- > Feasibility Studies
- > Batch & Pilot Testing
- > Laboratory analytics
- > Scientific support
- > Research & Development
- > Engineering Services
- > Process design and -optimization
- > ...

### 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.



Porous diffuser in operation



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