ZonoSistem
Ingeniería del Ozono S.L.U

ozone

Tecnology to disinfect and purify

Drinking water
Process water
Waste water

ZonoSistem Ingeniería del Ozono S.L.U.
www.ingenieriadelozono.es
(+34) 956 85 47 83

Presentation
For water professionals

Who are we?

We are a factory of ozone generators

ZonoSistem
Ingeniería del Ozono S.L.U

Spanish Engineering, Design and Manufacturing Services.

Laboratory and Development services

Installation, maintenance, and agricultural assistance

We are close.
Assistance throughout the national territory and Europe

ISO 9001

ISO 14001

BIOCIDAL AUTHORIZATION

Miembro Fundador
www.euota.org
EUO3TA.org
European Ozone Trade Association

OZONO ESPAÑA

ISO 9001
ISO 14001
BUREAU VERITAS
Certification

Our factory

In El Puerto de Santa María, Cádiz

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We manufacture more than 500 ozone generators per year for Industries, Agriculture, DWTP, WWTP, Fish farms, etc.

WATER OZONE SOLUTIONS

AGRICULTURAL OZONE

Ozone to enhance and protect your agricultural crop. Ozone reduces the biofilm in the pipelines.

PROCESS WATERS

Ozone to disinfect and maintain the hygiene in water, supply tanks and their pipes.

SEWAGE WATER

Ozone to disinfect wastewater, reduce COD, BOD, turbidity, color, odor, etc. Ozone to reduce those parameters before the sewage discharge.

DRINKING WATER (DWTP)

Ozone for drinking water treatment plants

TEXTILE LAUNDRY

Ozone to reduce the consumption of detergents and bleaches in laundries. Reduces the environmental impact.

SWIMMING POOLS

Ozone to reduce the use of chlorine in public and private swimming pools. Crystal clear water without odor or taste.

FISH FARMS AND AQUARIUMS

Ozone to disinfect and purify water in aquatic ecosystems and farms.

CUSTOM PROJECTS

Ozone to disinfect and purify water in personalized processes. We adjust to your needs.

Problems with your water?

Do you need to disinfect the water?

Do you need to eliminate microorganisms in pipes and tanks?

Do you need to remove Biofilm from the pipes and filters?

Color, odor, turbidity, COD, BOD, problems?

Heavy metal or emerging pollutants issues?

Do you need to disinfectar without chlorine?

Chloramines problems?

Do you want to be more respetfull with the environment?

Do you know that ozone...?

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Is a powerful disinfectant

It has a higher oxidation potential than chlorine. It quickly removes viruses, bacteria, fungi and molds from water, pipes, filters and tanks needing. It removes biofilm.

Purifies

Ozone also reduces color, odor, taste, turbidity, COD, BOD, suspended solids, heavy metals, and emerging pollutants.
It improves quality of drinking, process and waste water.

Is generated in situ

It is not transported nor stored. It does not need labour or additional chemicals.
It is generated from the oxygen in the environment and is applied instantly in an automatic, controlled and safe way.
Environmentally friendly.

Did you know that ozone is a technique with enormous advantages for industries, and affordable for most of them. In addition, it is respectful with the environment.

How is ozone generated?

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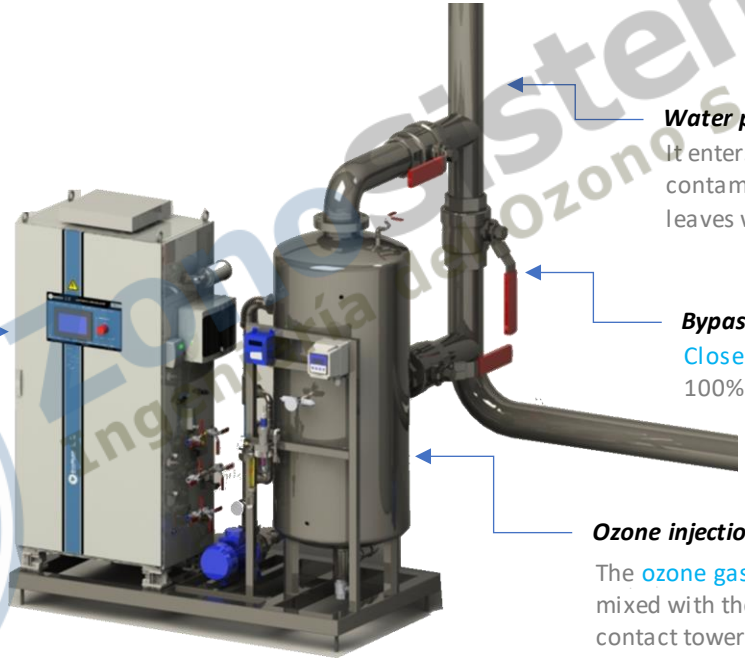
The air that we breathe has 78% Nitrogen, 21% Oxygen and 1% other gases. Ozone is a molecule made up of three Oxygen atoms.

Ozone generator

It takes the air we breathe, concentrates the oxygen up to 95% purity, and discards the nitrogen. Then the generator transforms the oxygen (O2) into ozone (O3) through an electrical discharge.

Ozone is very powerful, but has a low residual effect, which is a great if you want to disinfect without residues.

Once generated, ozone is conducted to the dissolution system.



Water pipe

It enters the tower with contaminated water, and it leaves with ozonated water.

Bypass

Close the valve and treat 100% of the water flow.

Ozone injection and mixing

The ozone gas is injected and mixed with the water in the contact tower.

Fully automatic system. It does not require any chemicals or labor.

To generate ozone you just need Oxygen and electricity.

How do you inject ozone in water?

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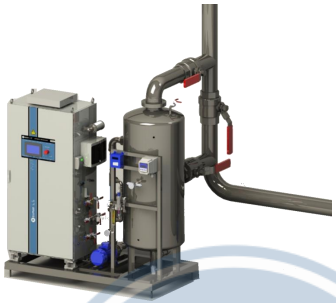

HIDRO VT

By inyection directly into the pressurized pipe.

Ozone is injected into the water in the pipe by means of a venturi, a pump, and a contact tower. They are located on the line to be treated.

HIDRO V

By recirculation in tank.

Ozone is injected into the tank. There is a pump and a venturi that carry out the process. The contact between the ozone and the water happens in the tank.

BUBBLING

By bubbling in a contact chamber

Ozone is bubbled using a porous stone which generates ozone micro bubbles to dilute the ozone into the water.

How is ozone measured and controlled?

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There is no use investing in **ozone**, if there is not a proper control system.

Control by PLC. Touch screen

ppm Ozono Meter ***Redox Meter***

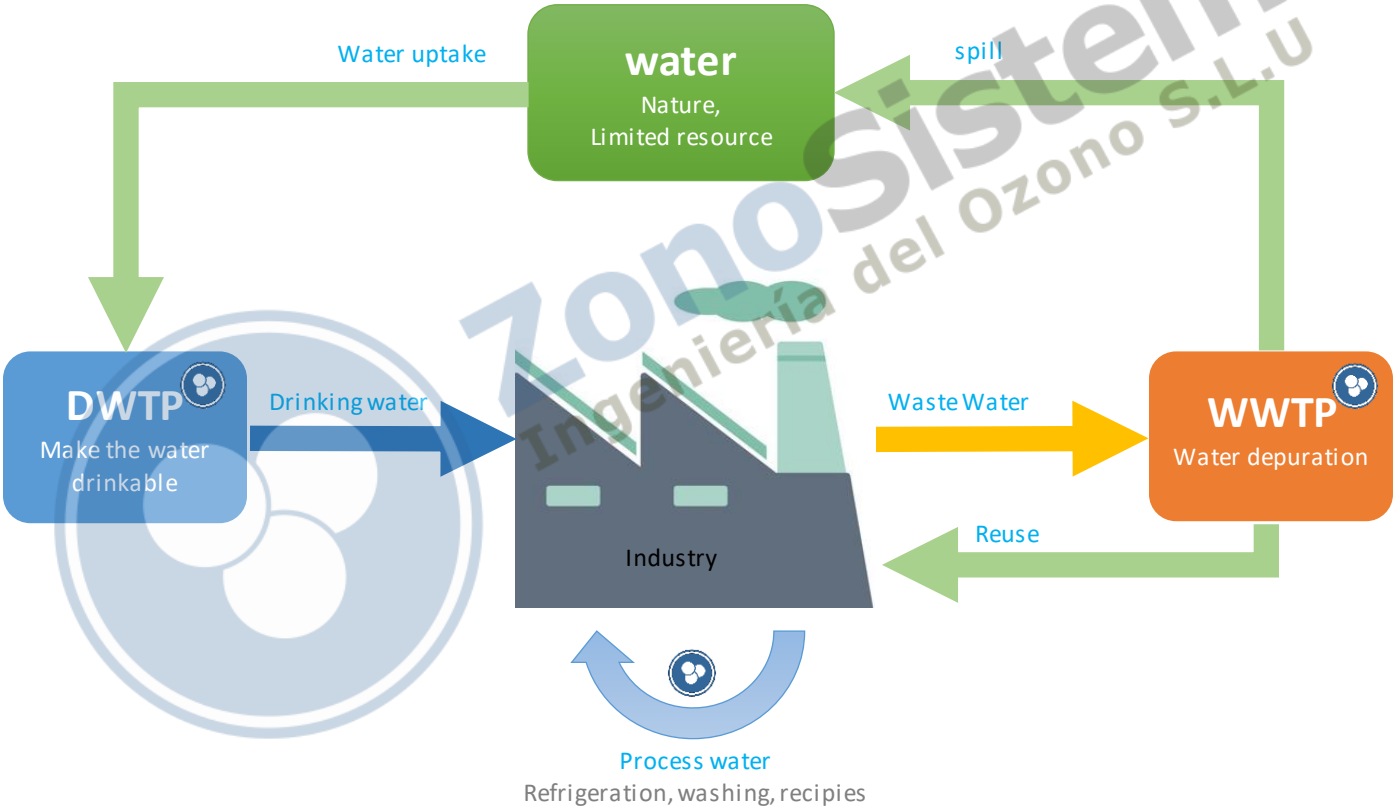
Select the ppm o the redox you want to work with.

Options:

- VPN remote access.
- Regiter your data.
- Real time graphs.
- Alarm control.
- Weekly planner.

The equipment **adjusts itself** according to the dissolved Ozone or the Redox potential of the water. You can also work manually using the screen, or **remotely.**
TCP-IP / ModBus communication capability.

Where to apply ozone?



OZONE IN DWTP

Some of our references

- DWTP Aguilar de Campó
- DWTP Jerez de los Caballeros
- DWTP Carballo
- DWTP Hornachos
- DWTP Villafranca
- DWTP Zafra

Target in PRE phase

- Flocculation and coagulation are improved.
- Algae are controlled.
- Disinfection starts.
- Heavy metal and micro pollutants oxidation.
- The generation of trihalomethanes is reduced.
- Emerging pollutants are oxidized.
- Arsenic is removed.

Target in INTER phase

- Improves filtering performance.
- Reduces the frequency of filter cleaning.
- Oxidizes NOM and increases biodegradability in filters (CAG).
- To improve the performance of activated carbon.
- To eliminate the rest of Fe and Mn.

Target in POST phase

- Disinfection.

Settings

- Productions: from 0,1 till 10 KgO3/h at 150g/Nm3.
- Type of Generators: GRV, oxygen LOX.
- Technique: by bubbling in a contact chamber.
- 0,4 - 1 ppm y 4-10 minutes of contact.

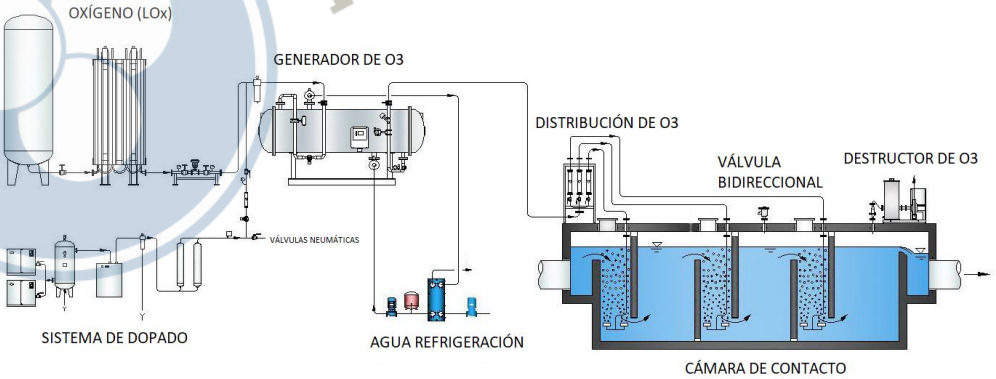
Example (DWTP)

PROBLEMS

- **Poor quality** of dammed water.
- **Organic matter** and pollution.
- **THM´s precursors** after coloring.

SOLUTION

- Ozonation in the PRE phase and in the INTER phase.
- Active carbon support.



Ozone in DWTP

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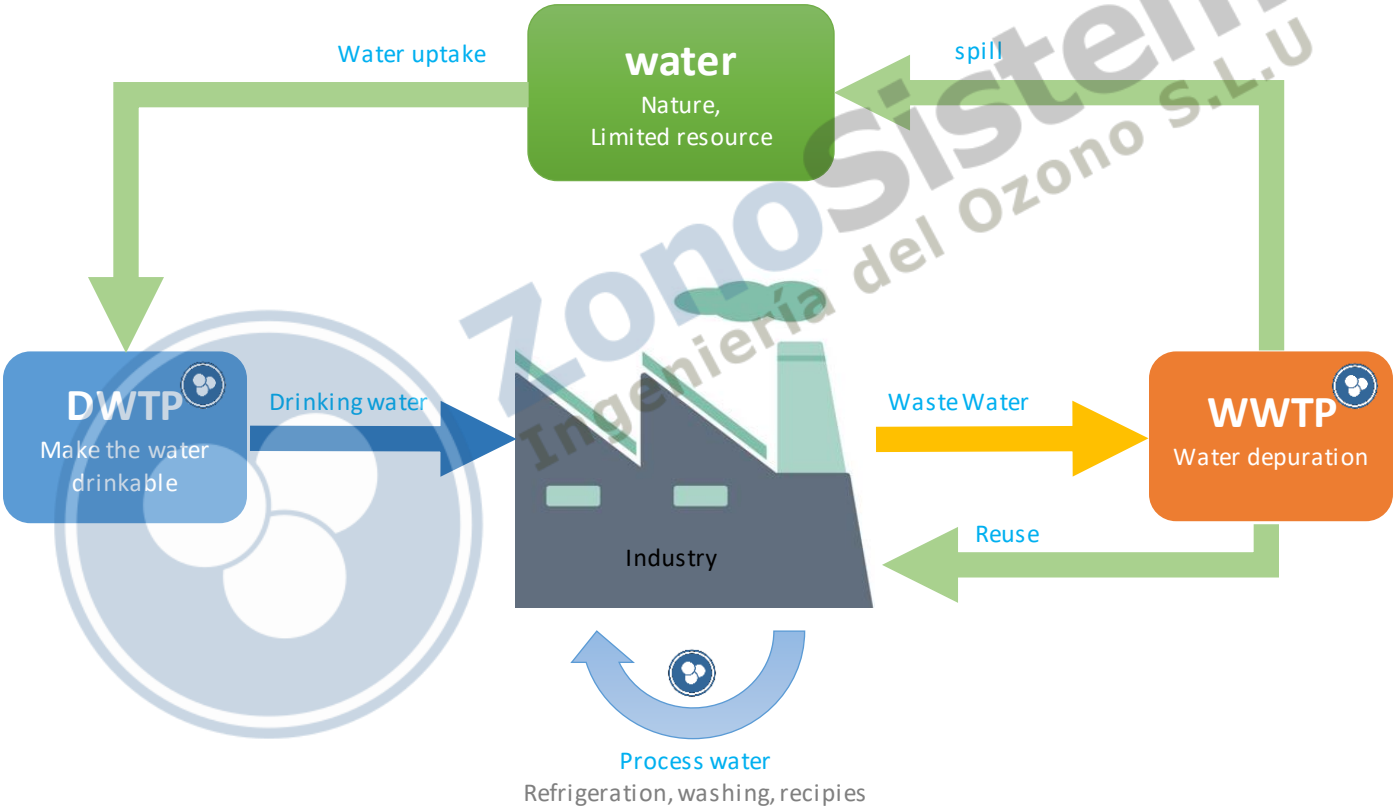
Where to apply ozone?



OZONE IN PROCESS WATER

Some of our references

- Odyssee
- SPB Sevilla y Valencia
- Aquaservice
- Bodegas Avelino Vegas (winery)
- Ahumados el duende
- Biosabor
- Grupo Inditex
- Cocacola

Target in water for cooling

Cooling circuits and cooling towers.

- ✓ Disinfect: specifically legionella
- ✓ Reduce biofilm
- ✓ Reduce chemicals

Target in washing water

Fruit washers, CIP systems, vegetables, fish, and cleaning.

- ✓ Disinfect water and surfices.
- ✓ Increase the time the water can be used. Saving water.
- ✓ Reduce chemical loads in treatment plants (WWTP)

Target in water for recipies

Bottling, chemicals, pharmaceutical and food recipies.

- ✓ Avoid chlorine, peracetic and other chemicals, which alter the recipe.

Settings

- Production: from 20g till 500 gO3/h at 70-100g/Nm3.
- Type of generator: Autonmous as GRZO with PSA.
- Techniques: in HIDRO V tank, and HIDRO VT pipe.
- 0,2 a 1,5 ppm, with short contact times.

Example: Cooling Tower

PROCESS DESCRIPTION

- Ozone for **water microbiological control** and superfaces cleaning in cooling towers.
- Continuous 0.3ppm dose.
- **Remote** control and access to a shared computer platform with healthcare, the client and the supplier.
- **Record** of all data.

OZONE EQUIPMENT DESCRIPTION

- Compact ozone generator that **recirculates** the water of the evaporation tower.
- Systems ready to work 365 days a year, 24 hours a day.

Example: manufacturers of chemical products

PROCESS DESCRIPTIÓN

- **Osmotized** and **distilled** water, **stored** for processing.
- They don´t add chemicals.
- Ozono gran aliado e imprescindible.
- Máxima **desinfección sin químicos** residuales tanto del **agua** como de las **instalaciones**.
- Control preciso y efectivo.

OZONE GENERATOR DESCRIPTION

- Industrial plant 24/7.
- Spare generator. Auto start.
- Injection system in each tank.
- Automatic ozone distribution according to need.
- Measurement of dissolved ozone in each tank.
- Control of **zero residual** in your process.
- **Shock treatments** scheduled on weekends.

Example: Industrial ironing, process waters

PROCESS DESCRIPTION

- Maintenance of the hygiene of the process water that is stored in buffer tanks
- Water and facilities sanitation

OZONE EQUIPMENT DESCRIPTION

- Professional recirculation plant. Water is taken from the 10 tanks and returned once is treated.
- Dissolved ozone and remote control for managing the process.

Example: Fish farm process water

PROCESS DESCRIPTION

- **Disinfection** of the water that goes to the fish-fattening farm.
- Recirculation water disinfection and oxygenation.

OZONE EQUIPMENT DESCRIPTION

- Industrial plant. 500g / h. In contact chamber.
- Control by redox + dissolved ozone + dissolved oxygen.
- PLC with parameters of the whole process.

Example: bottling companies

PROCESS DESCRIPTION

- **Product water disinfection** after passing through osmosis
- Disinfection of bottles without leaving residues

EQUIPMENT DESCRIPTION

- HIDRO V GZO professional plant: **recirculation** in a **buffer tank**.
- **On line** professional plant: to disinfect bottles and facilities at high concentration and high pressure.
- PLC control with remote access: control of the process, data logging and alarms.

Example: barrel washing and CIP. Wineries.

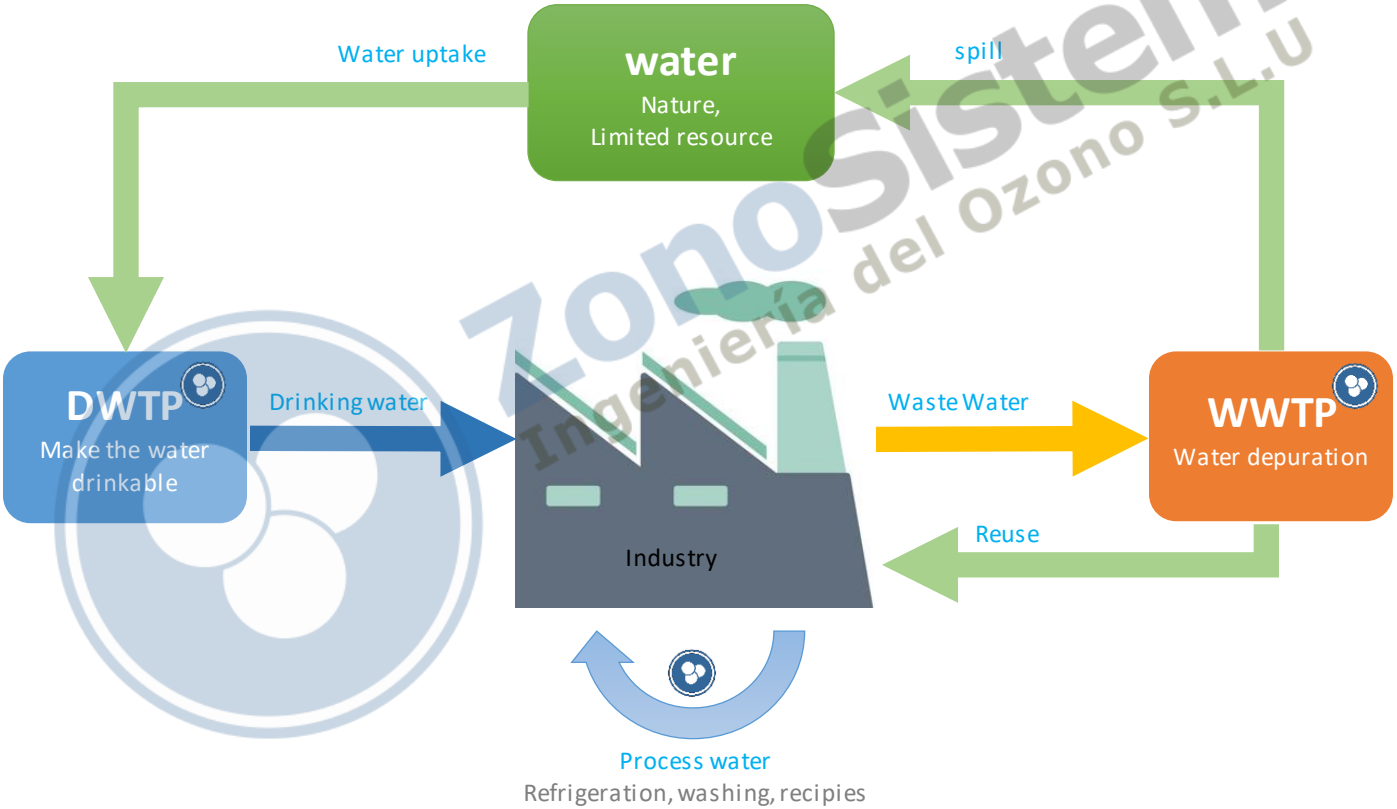
PROCESS DESCRIPTION

- Chemical-free barrel washing, removal of Acetobacter, Lactobacillus, Ethyl-phenol (Bretanomyces indicator)
- **CIP** cleaning of facilities. No need of chemicals or increasing the temperature.

EQUIPMENT DESCRIPTION

- HIDRO V GZO professional plant: in the CIP washing circuit.
- HIDRO V GZO professional plant: Pressurized line for barrel washing.
- PLC control with remote access: process control, data logging and alarms.

Where to apply ozone?



OZONE IN INDUSTRIAL WWTP

Goals

- Reduce COD AND BOD.
- Eliminate phenols.
- Oxidize heavy metals.
- Color, odor, turbidity
- Cyanide, arsenic, pesticines, etc.

Common settings

- Equipment of 100g and 10 KgO3 / h at 100-150g / Nm3.
- Generators with LOX oxygen supply, or with compressor and PSA
- Recirculation or bubbling technique, because contact times are required.

Some references

- cogeneración plant SEDEBISA, Córdoba.
- Petrochemical plant GEMS, Arabia Saudí.
- Distillate plant TOMSA, Chile.
- Flour plant PURATOS, Barcelona.
- Plant in Hospital, Sri Lanka.
- Waste plant LITOCLEAN ,en Barcelona.
- Pharmaceutical waste plant, IEG Hungría.
- Plant in Sidelu Scie Italia
- Dye oxidation plant.
- Etc

Water laboratory tests

- It is recommended to do a water test, before acquiring an ozone equipment. Testing the water in our laboratory will tell us if the treatment is viable, and we will be able to see which equipment is better according to the client's needs.

LABORATORY TESTS

We test the water before delivering a final project

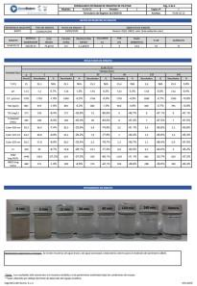
ZONOSISTEM technicians test the water at different PH, different concentrations, different contact times.

Possibility of pretreating water and simulating a Jar Test.

Post-treatment with Activated Carbon

Advanced oxidation with H2O2.

After completing the tests, a complete report and a definitive proposal are presented.



Example: Alperujo leachate

PROCESS DESCRIPTION

- Waters from the leachate of silos of alperujo with very high values of COD and phenols.

EQUIPMENT DESCRIPTION

- Industrial ozone plant to treat batches of 20m3 / h every 4 hours.
- Application by bubbling in a 6 m high tank.
- Generator production 500g/h.

Example: sweet potato wash water reuse

PROCESS DESCRIPTION

- Farm with a **shortage** of water to wash sweet potatoes.
- Clean water circuit is filled.
- 100% of the wash water is reused.
- Sand and sludge are decanted, filtered and disinfected.

EQUIPMENT DESCRIPTION

- Professional washing plant in the water line.
- High disinfection of the water and the surface of the sweet potato.
- Notification of alarms to production manager.
- No chemical residue.
- Environmentally friendly.

Example: flour factory

PROCESS DESCRIPTION

- **Filamentous bacteria** problems that cause foam in the biological treatment, in addition to problems in purification performance.
- The ozone generator works in **PRE treatment,** killing filamentous bacteria, reducing organic matter, reducing COD, reducing BOD and making organic matter more biodegradable.

EQUIPMENT DESRCRIPTION

- 600g / h industrial plant applied to a vertical tank with continuous water flow.

Example: Soil recovery

PROCESS DESCRIPTION

- Soil purification with extraction of residual water, surface treatment and subsequent injection.
- Elimination of emerging pollutants.

EQUIPMENT DESCRIPTION

- High concentration 150g / h industrial ozone generator.
- On-line treatment within a complex multi-stage purification process.

Example: cytostatics Cuba

PROCESS DESCRIPTION

- After washing the soft capsule manufacturing facilities, a discharge with a high concentration of cytostatics is generated .

EQUIPMENT DESCRIPTION

- High concentration industrial ozone generator applying ozone in a 6 m high contact tank.
- Homogenization pretreatments and PH control so that the reaction kinetics is correct.

Example: petrochemical residual

PROCESS DESCRIPTION

- Oxidation of organic matter prior to biological treatment in refinery cleaning water (Spent caustic).

EQUIPMENT DESCRIPTION

- High concentration industrial ozone generator.
- Several treatment plans between 1Kg and 9 Kg .
- Oxygen supply from LOX.
- Saving of biological time and improvement of parameters.

Example: Ozonation in WWTP

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1º LABORATORY TEST

PROCESS DESCRIPTION

- Reduction of **COD, BOD**, color, turbidity, suspended solids, dissolved solids and **microbiology**.
- Odor control.
- Direct discharge water without going through WWTP.

EQUIPMENT DESCRIPTION

- System: blowers with air + ozone.

2º LABORATORY TEST - in-situ

3º pilotaje a escala real

Example LABORATORY TEST - WWTP

PARÁMETROS	ELAB-20.22								
	Tiempo (min)								
	0	5		15		30		60	
	Resulta	Resultados	%	Resultados	%	Resultados	%	Resultados	%
T (ºC)	25	25,1	N/A	25,1	N/A	25,2	N/A	25,4	N/A
pH	7,15	7,2	0,7%	7,26	1,5%	7,45	4,2%	7,53	5,3%
C.E. (µS/cm)	1782	1750	-1,8%	1690	-5,2%	1766	-0,9%	1702	-4,5%
TSD (ppm)	891	875	-1,8%	845	-5,2%	882	-1,0%	850	-4,6%
TSS (mg/L)	273	250	-8,4%	175	-35,9%	53	-80,6%	9	-96,7%
Turbiedad (FAU)	283	266	-6,0%	169	-40,3%	48	-83,0%	8	-97,2%
Color 436 nm	39,3	36,4	-7,4%	30,3	-22,9%	9,9	-74,8%	3,5	-91,1%
Color 525 nm	34,2	30,8	-9,9%	24,2	-29,2%	7,6	-77,8%	2	-94,2%
Color 620 nm	30,5	27,8	-8,9%	20,3	-33,4%	6,2	-79,7%	1,3	-95,7%
I.C.	104	95	-8,7%	74,8	-28,1%	23,7	-77,2%	6,8	-93,5%
DQO (mg O2/L)	895	569	-36,4%	591	-34,0%	523	-41,6%	429	-52,1%
DBO5 (mg O2/L)	480	471	-1,9%	438	-8,8%	374	-22,1%	129	-73,2%

We also have ozone solutions for

Agriculture

- To disinfect and remove biofilm in irrigation pipes.
- For foliar treatment of the crop.
- To remove the zebra mussel.

Swimming pools

- To reduce chlorine consumption.
- Chloramines and organochlorines reduction.
- In public swimming pools and water parks.

Zoos and Aquariums

- For disinfection and improvement of the quality of the supply water and recirculation water.

We also do customised projects

Containers, easy transport and ready-to-go.

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Many thanks for your attention!!

www.zonosistem.com
Fábrica 956 854 783
Sales manager 633 333 748

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C\Alfred Nobel Nave 7 y 8,
P.I. Salinas de Poniente. 11.500.
El puerto Santa María,
Cádiz, España

Ozone generators
Water treatments
Air treatments