

Waste & Wastewater treatment

Smart solutions for water recovery



Making life better through gas technology

Nippon Gases, part of the global Nippon Sanso Holdings Corporation, is a leading company in the industrial and medical gases sector across Europe.

We deliver safe, reliable, and tailored gas solutions to a diverse range of industries and markets.

The application of different gases in the wastewater treatment procedures allows for a highly efficient and safe biological process.

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Our presence in Europe

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All regions



Spain, Portugal

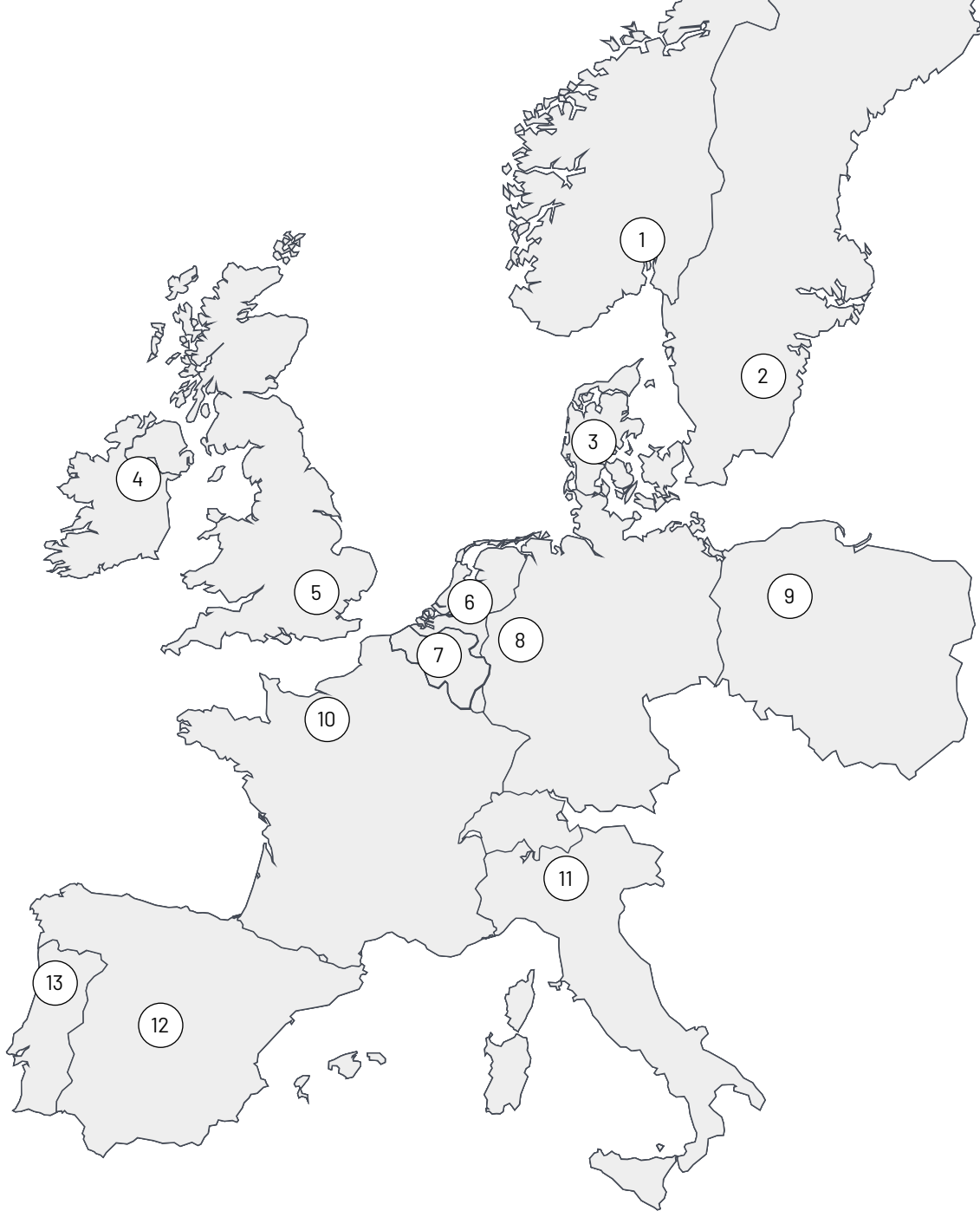


Italy

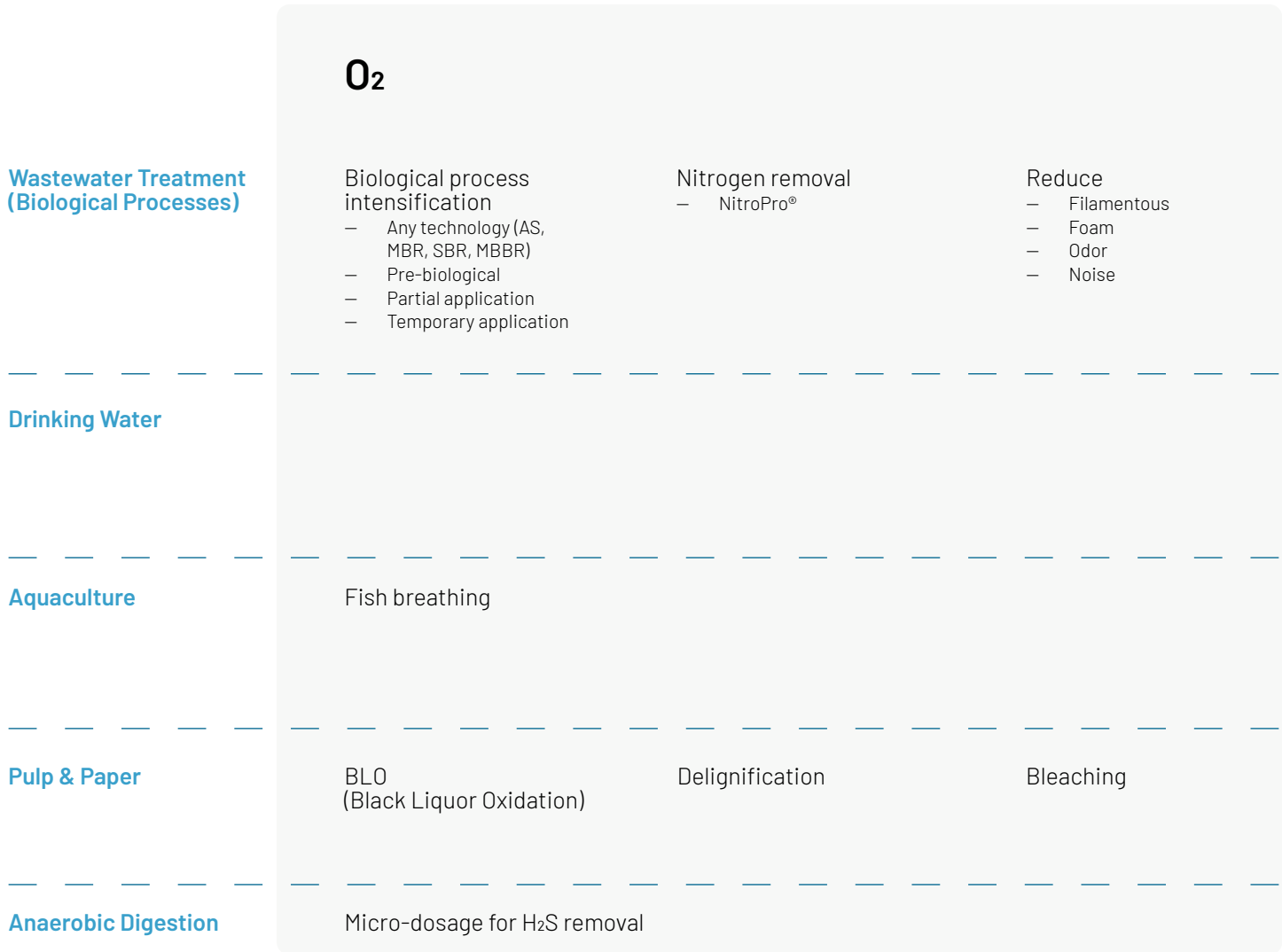


Germany





Applications map



CO₂

pH neutralisation
Substitute mineral acids for pH reduction

Struvite prevention
Prevents its uncontrolled formation in pumps and pipes

Remineralisation
Anti-scaling
Aluminum reduction
Softening

Acidification
Brown stock washing
pH control

O₃

Inert COD removal

Sludge produced reduction

Water disinfection

Ozone bleaching

N₂

Inerting

VPSA

High O₂ consuming biological reactors

Bleaching

Delignification

Biomethane

Pure Oxygen (O ₂)	Ozone (O ₃)	Carbon Dioxide (CO ₂)
Increases the speed and capacity of the biological process in existing installations.	Reduces recalcitrant COD by oxidation before discharge to reach authorised limitations.	Water & wastewater pH neutralization, alternative to traditional mineral acids.
Removes COD and nitrogen, upgrading your process to compact, fast, flexible and efficient.	Removes colour.	Safe handling and process security, buffer capacity.
Reduces energy consumption and aeration related problems: foaming, odors and noise.	Clean disinfection for drinking or water reuse.	Drinking water remineralisation and softening, scaling prevention.

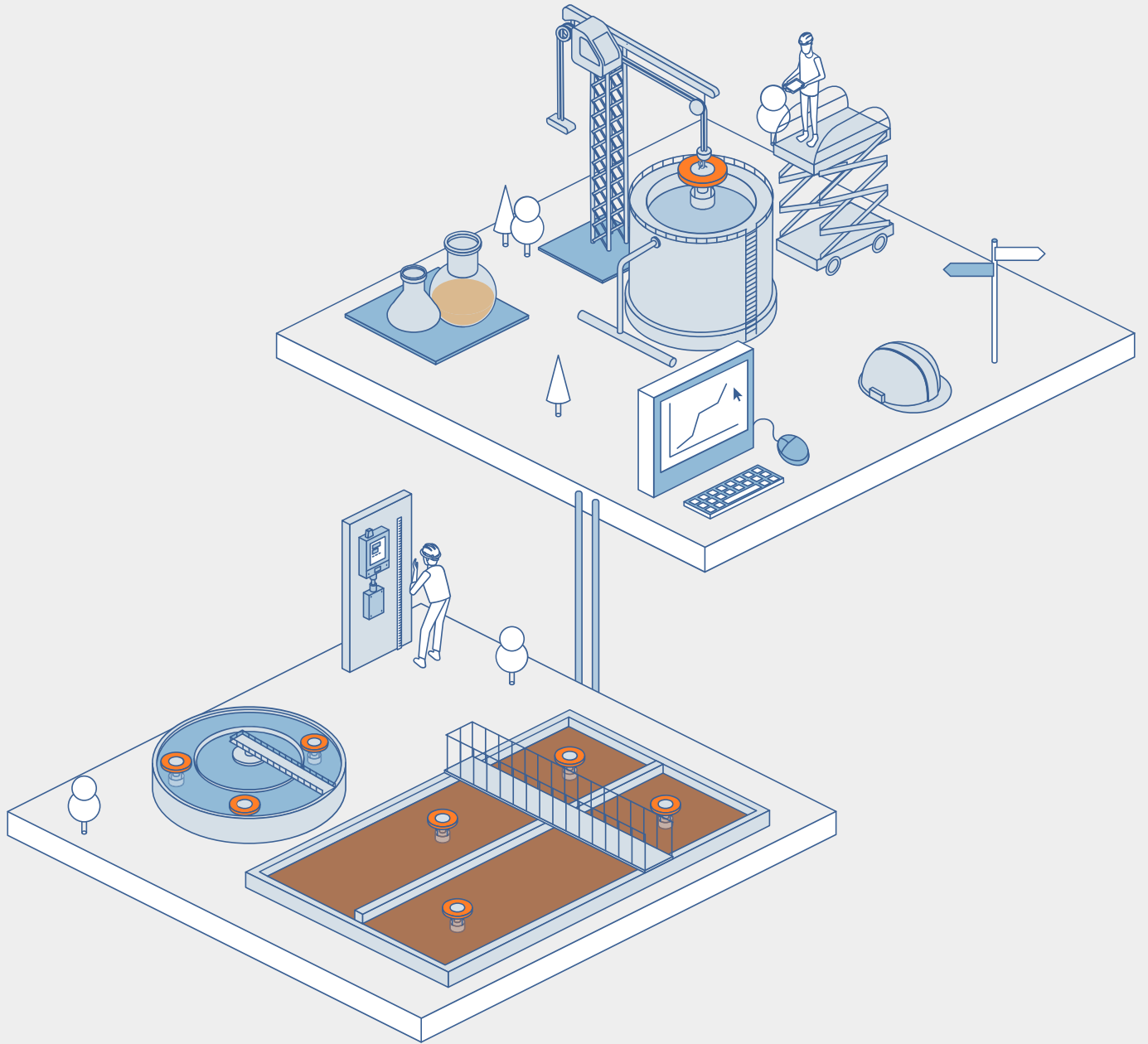
WaterSan® services

MiruGas®:
Instrumentation,
monitoring and control.

Simulate: Design and
optimization studies with
process simulators for
proposal making.

R&D: Laboratory
analysis and water
characterization,
experimental studies.

NitroPro®: Advanced
controlled nitrogen
removal.



Pure Oxygen

Pure oxygen is an alternative to traditional aeration.
Main differences versus using air:

100% O₂ content (vs 21%)

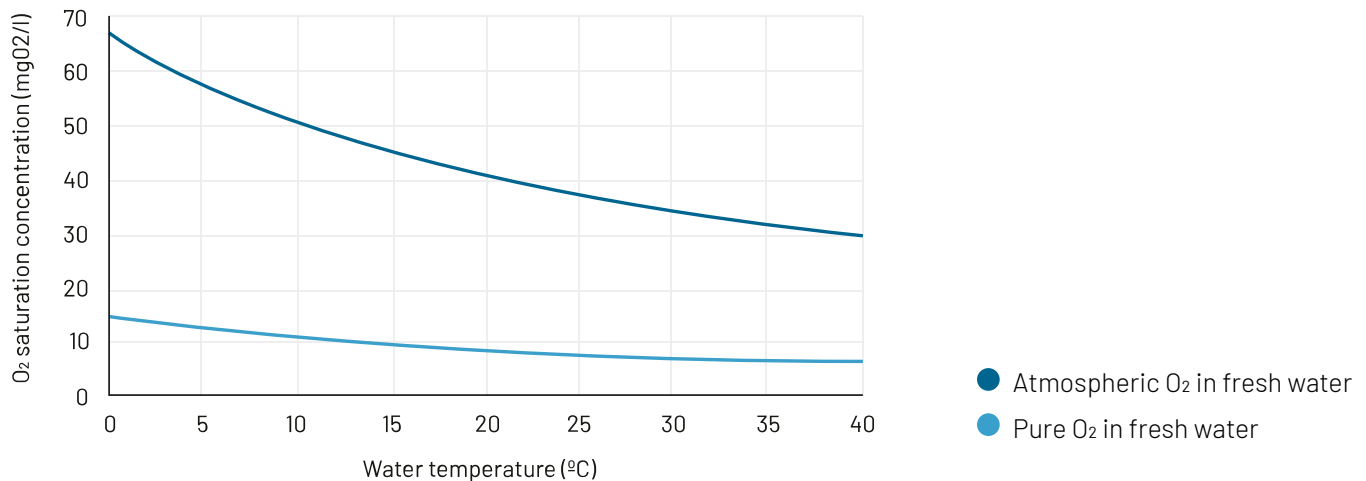
5 times faster to dissolve in water

High solubility even at high temperatures

The properties of pure O₂ make it advantageous in the following contexts:

- Avoid investment to increase plant capacity
- Need to reduce energy consumption
- High organic load wastewater treatment
- High nitrogen content wastewater treatment
- High biological process temperature
- High biomass solids concentration (MBR)
- Variability of wastewater characteristics

Dissolution of air and pure oxygen at ambient pressure



Carbon Dioxide

Carbon dioxide is an alternative to traditional acids.
Main differences versus using acids:

Safer to store, handle and use

Buffer effect against overdose (min pH = 6)

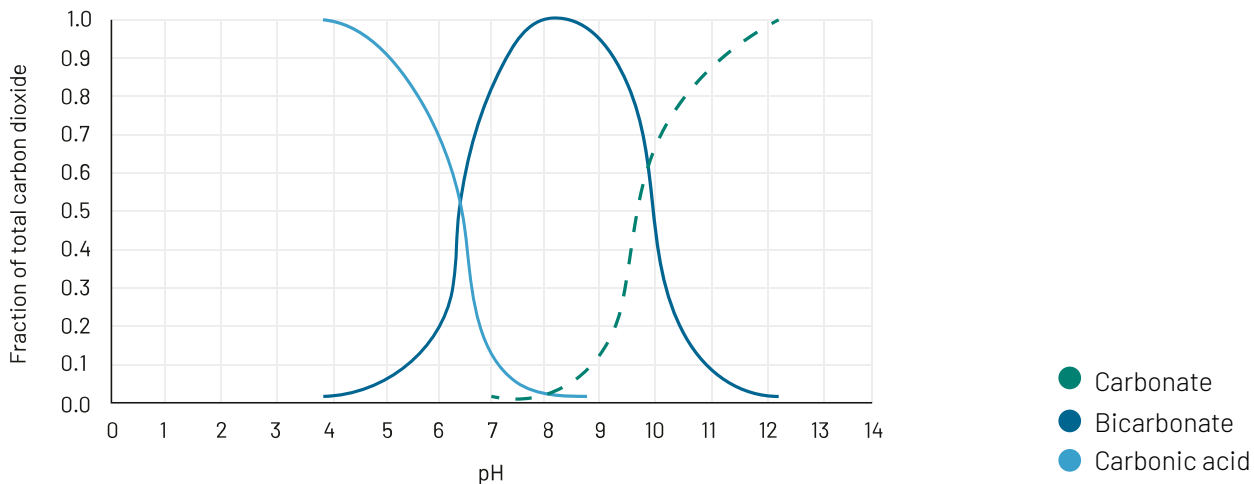
Not corrosive, not undesired elements added

Environment, Health & Security friendly

The properties of CO₂ make it advantageous because:

- Reuse of captured carbon, no emissions
- Accurate and easier pH control (weak acid)
- Avoid release harmful compounds to the water: sulphates, chlorides or aluminum
- Secondary containment is not required
- More economical and sustainable
- Superior results in applications: Neutralisation, anti-scaling, struvite prevention, drinking water softening and remineralisation

Balance of different forms of carbon according to pH



Ozone

Ozone is the strongest industrial scale oxidiser.
Main properties:

Efficient production from pure O_2 for industrial application (smaller footprint, no pretreatment)

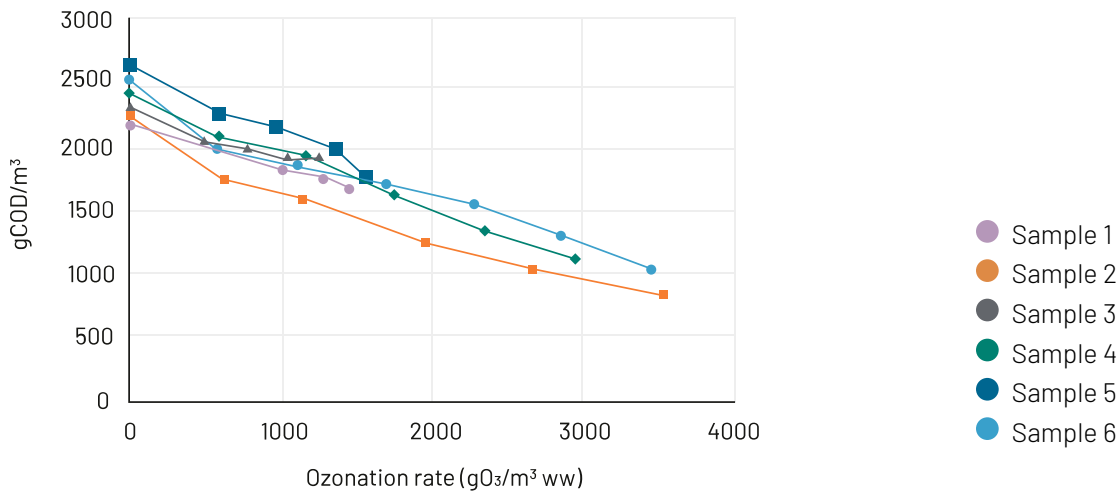
Colourless and characteristic metallic odor

Short life, decomposes to O_2 (can be recycled)

The properties of O_3 make it useful for:

- Remove colour and recalcitrant COD from wastewater
- Increases the biodegradability of matter
- Purify drinking water
- Disinfect for industrial water reuse
- Eliminate aerosols
- Toxicity reduction (micro-pollutants and emerging concerns)

Recalcitrant COD ozonation (experimental results; chemical industry)





WaterSan® MiruGas®

Instrumentation, automation and control

Remote monitoring tool for capture and track of data: probes and instrumentation, offline lab analytics, webcams and other data sources.

Customisation for each treatment plant with the possibility of incorporating control algorithms, inline data processing to transform data to usable information in real time, webcams and other resources to optimise the operation of the process.



WaterSan® Simulate

Mathematical simulation and data treatment

Expert advice from a dedicated team in treatment processes based on a developed simulator for each customer plant.

Theoretical studies to develop proposals and optimise the actual plant. Different operating strategies are evaluated to predict effects on process performance and costs.



R&D

Analysis and testing for evolving industry needs

Our R&D focuses on innovation and market anticipation, enhancing solutions for water and wastewater treatment.

Through specialised lab analysis and experimental testing, we optimise processes with custom pilot testing, biodegradability studies, respirometry analysis, and performance tests using O_2 , CO_2 , and ozone oxidation.



WaterSan® NitroPro®

The technological solution for Advanced Total Nitrogen Removal

WaterSan® NitroPro® technology automates oxygenation cycles, reducing the total nitrogen in the discharge, operating costs, and the plant operator's dedication time. It includes an online monitoring system for the main process parameters (OD, Redox, $N-NH_4$, $N-NO_3$...). NitroPro® adapts to each WWTP, regulating the oxic and anoxic cycles according to behavior patterns and variations in pollutant load.



Equipment

Gas injection for water applications

Equipment selection depends on the plant size, geometry and estimated gas consumption

Gas supply & control system



Electric panel & remote monitoring

Low consumers Gas injection and diffusion systems



Mizu LCO[®] Sub 20/3



SSD inline diffusion

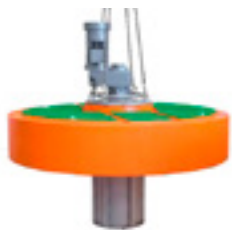


Diffusers

General Gas injection systems



Mizu LCO® Float 20/5
Mizu LCO® Float 60/10
Mizu LCO® Float 85/20



Mizu LCO® Float 120/22



Mizu LCO® Sub 60/13
Mizu LCO® Sub 100/22

Gas provision possibilities



Liquid gas tank,
Nippon Gases distribution service



PSA O₂ generator, plant maintenance



Learn more

nippongases.com

Contact

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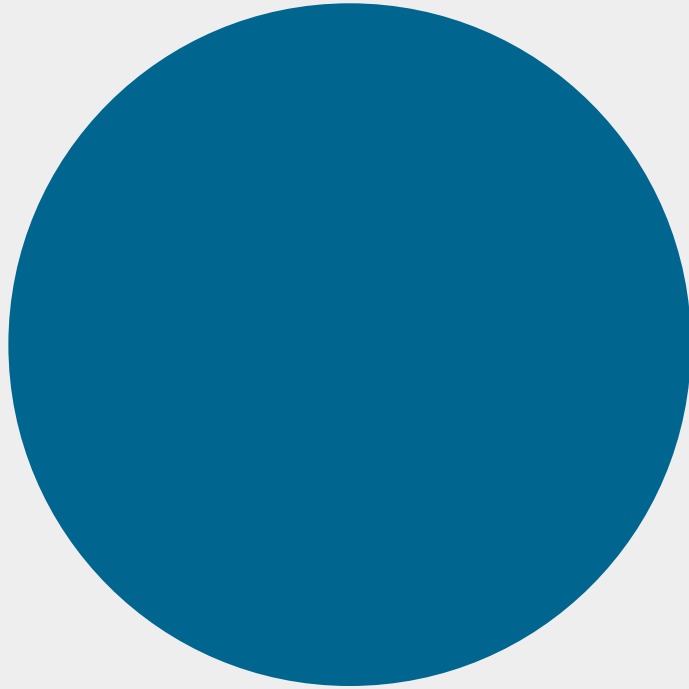
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