DE NORA
our research - your future

Using the earth's natural protection to keep your water safe

DE NORA OZONE SYSTEM FOR ADVANCED WATER TREATMENT AND DISINFECTION

The growing demand and consumption water for wide ranging industrial applications has led to increased volumes of water sources containing difficult to treat pollutants.

De Nora Ozone bespoke solutions are built on the industry's longest experience.

Rely on De Nora for your ozone needs

Ozone offers a range of advantages:
- No residuals creating biological sub-products
- Quick reaction time
- No chemical compounds required - generated by air or pure oxygen
- Can be produced on-site as required
- The strongest natural oxidants

Long history of ozone experience:
With more than 45 years' of dedication to solving some of the toughest problems and treating some of the most difficult pollutants such as hydrocarbons, surfactants and phenols, De Nora Ozone is one of the original pioneers of ozone treatment solutions for industrial applications.

Close to you - everywhere:
Being a part of De Nora, a global organisation with employees experienced across marine, municipal, energy and industrial markets in North America, Latin America, Europe, the Middle East and Asia, means you benefit from access to a global network of knowledgeable technical and aftersales support.

Flexible and tailor-made solutions
De Nora listens and works closely with you to develop and supply the best available solution for your needs.

Performance you can trust
De Nora offers a reliable solution to maximise ozone concentration while minimising energy requirements.

Innovation at our core:
With more than 350 patents across the group applied to over 2,000 individual applications, De Nora is unique in terms of the range of disinfection technologies under its belt; from ozone, ultraviolet, peroxide, advanced oxidation, electrochemical, gas feed, chlorine dioxide through to chemicals and tablet feeders.

Markets and applications

Municipal Drinking Water

Because of its excellent disinfection and oxidation qualities, ozone is widely used for drinking water treatment.

- **Municipal plants**: ozone can be added at several points throughout the treatment system, such as during pre-oxidation, intermediate oxidation or final disinfection. Usually, it is recommended to use ozone for pre-oxidation, before sand filters or with active carbon filters (GAC).

- **Industrial systems**: oxidation of iron, manganese and organic compounds contained in well water for drinking purposes or as process water.

Food and Beverage

These markets need non-residuals and green solutions to increase the food quality and food shelf life.

- Drinking water disinfection, filling machines and bottles washing by ozonated water.
- CIP (clean in place) circuit disinfection and biofilm formation prevention.
- Fruit and vegetable washing by ozonated water.
- Water teuse in fruit and vegetable washing lines.
- Cold rooms and storages air treatment to prevent bacteria and mold development.
- Cereals treatment for aflatoxins and mycotoxins oxidation.
- Fish farming water treatment.

Municipal Wastewater

Ozone is generally used as final stage for colour and odour removal but also for specific pollutants oxidation and final disinfection.

- Wastewater final polishing and disinfection: disinfection, odour and color removal, cyanides, phenols and ccomplex organic molecules oxidation. A final ozone treatment enables water reuse for applications such as irrigation and wash-water.

- **Micropollutant treatment**: pharmaceutical and agriculture residuals cannot be completely treated by traditional biological and chemical processes. Many of these substances have an endocrine effect on the hormonal system of humans and animals. These so-called endocrine disrupting compounds (EDCs) have an impact even at low concentrations.

- **Ozone and Biofiltration**: the combination of TETRA and OEI long standing technologies to obtain an high quality and reusable water. COD, BOD, TSS, complex organic molecules such as micropollutants and nitrogen compounds are removed by a single final polishing stage.

Industrial Wastewater

Industrial wastewater is caracterized by specific pollutants that cannot be treated simply by traditional biological and chemical processes.

- **Wastewater final polishing:** phenol and hydrocarbon oxidation in refineries and chemical wastewater, colour and surfactants oxidation in textile wastewater, micropollutants oxidation in pharmaceutical wastewater, COD and BOD oxidation to meet discharge limits and wastewater disinfection.

- **Pilot units and pilot tests:** OEI offers a professional service to design the best ozone and AOP solution tailored for each specific case through internal laboratory analysis, pilot plants, and pilot units for test on-site.

Combining De Nora's established ozone and biofiltration solutions ensures an ideal method of removing COD, BOD, TSS, complex organic molecules and nitrogen compounds from wastewater

We understand that each wastewater treatment requirement is unique, even across the same industry. De Nora Ozone offers the expertise to ensure you get the most effective technical solution through pilot plants, testing and scale units.

Swimming Pools & Spa

Ozone can be used for private, municipal or commercial swimming pools. There are a number of health-related and system-related advantages of ozone for these applications including:

– Prevention / reduction in chloramines
– Prevention / reduction of chlorine off-gassing
– Inhibition of the formation of chloro-organic byproducts such as trihalomethanes (THMs) (toxic or carcinogenic)
– Reduction / elimination of caustic gases
– Reduction or elimination of chlorine odours
– Increases in overall effectiveness of your entire filtration system
– Greater effectiveness against giardia lamblia and *Cryptosporidium* organisms

Air Treatment

A new solution that combines O_3 gas with selective dry scrubbers. Pre-oxidation by O_3 oxidizes the organic compounds and a final dry scrubber stage, by a selective media, removes H2S, Ammonia and other inorganic compounds. Ozone increase the life of the media.

Advantages compared with a traditional wet scrubber:

- 95% reduction of odour and pollutants with a single stage
- High efficiency even against gas streams with variable pollutants loads
- No water or chemicals required
- Low contact time that means compact systems with small foot-print
- Media life guaranteed and measurable

Biological Sludge Reduction

Biological sludge disposal is one of the major costs for a wastewater treatment plant. Biological Sludge Oxydation treats a partial stream of the return sludge. Sludge is metabolized back in the aeration basin. Damaged cellular structures of strongest organisms use energy derived from the consumption of nutrients for the restoration of the cell and not for reproduction.

Reduction of up to -40-50% of additional sludge requiring disposal, - 30% reduction of chemicals for sedimentation and flocculation, -30% of dewatering costs, -25% of filtration costs, -25% of transport costs, -90% of filamentous bacteria (main cause of foaming and bad bulking).

AOP (Advanced Oxidation Process)

Pollutants and molecules are becoming more and more complex and standard processes or stand alone technologies are not enough.

For difficult industrial applications, ozone by itself may insufficient or may be too expensive. De Nora combines ozone and/or ultraviolet, Peroxide and electrochemistry to design cost effective advanced oxidation processes that through OH. radicals formation can treat very hard pollutants and complex molecules. De Nora Ozone can perform laboratory tests or on-site analysis through to specific pilots plant to define the most effective combination of technologies.

De Nora Ozone Models

MCP-XTL Series

The MCP-XTL is the De Nora Ozone midsize range of ozone generators. Five different systems are able to produce between 40g/h and 1,400 g/h of ozone with ozone concentrations between 2 % wt and 15 % wt. All systems have a compact design and are integrated into a painted stainless steel cabinet, which also includes the air feed gas drying system for ozone production from air. Water cooled ozone generator and air cooled PSU.

TPF-XTL Series

The TPF-XTL is the De Nora Ozone mid-large size range of ozone generators. TPF-XTL systems produce between 1 kg/h and 44 kg/h of ozone with ozone concentrations between 2 % wt and 15 % wt. All systems have a compact design and are skid mounted up to 18 kg/h – even including the air feed gas drying system for ozone production from air. Water cooled ozone generator and air cooled or water cooled PSU.

De Nora can offer a passive control by fuses or an active control by a specific electronic device O3 SAFEGUARD, according with customer requirements and prefernces. De Nora Ozone can also combine the two system for an high control level of the equipment.

DTPF-XTL Series

The DTPF-XTL is the De Nora Ozone large size range of ozone generators. DTPF-XTL systems are able to produce up to 100 kg/h of ozone with ozone concentrations between 2 % wt and 15 % wt.Ozone generator and PSU water cooled.

Containerized Solutions

Containerized tailor made and customized complete solutions including feed gas preparation system, ozone generator, pump-injector or diffusion contact system, safety and process monitoring, MCC for power distribution and Main PLC for complete process managing.

De Nora Ozone Model Capacities

De Nora Ozone offers a range of models to cater for a wide range of ozone disinfection needs

Model Name	1 g/h	1 kg/h	50 kg/h	100 kg/h
MCP-XTL	1g/h - 1,4kg/h			
TPF-XTL		1 kg/h - 44 kg/h		
DTPF-XTL			9 kg/h - 100 kg/h	

Saving our best trait for after the sale.

A great product is nothing without a great support team. It's the assistance you encounter after a sale that distinguishes good products from the truly great.

To provide customers with a premium customer experience, De Nora offers aftersales support in four areas.

Technical service and user training.
Anywhere in the world, De Nora factory-trained technicians train to properly use and maintain your products.

Spare Parts and Consumables.
Supplied directly from De Nora and guaranteed to be produced to the original specifications and tolerances for exact form, fit and function.

Upgrades & Retrofits.
De Nora will guide you through the process of updating you in line with current specifications and standards for drinking water and wastewater treatment plants.

Asset Management and Solutions.
De Nora can help to assess the performance of your equipment in respect to your current and future throughput/capacity or quality goals.

ELECTRODE TECHNOLOGIES & WATER TECHNOLOGIES

DE NORA
our research - your future

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