PDOevo Ozone Systems

MAXIMIZE THE OZONE. MINIMIZE THE ENERGY.

WEDECO

a xylem brand

Ozone. Effective and environmentally friendly.

Ozone is one of the most powerful commercially available oxidants and is commonly used for municipal water and wastewater treatment. In addition to its oxidizing capabilities, it is an environmentally-friendly method of treatment. Pollutants, colored substances, odors and microorganisms are directly destroyed by oxidation, without creating harmful chlorinated by-products or significant residues.

By decomposing to oxygen as it reacts, ozone provides a cost effective and environmentally-friendly alternative to oxidation with chlorine, absorption (activated carbon), or other separation processes (membrane technology).

Advantages of ozone

- Ozone eliminates bacteria, viruses and most other organic and inorganic contaminants
- Ozone can replace and significantly reduce levels of dangerous chemicals such as chlorine
- Ozone acts as a flocculant aiding in the removal of minerals such as iron and manganese
- Ozone leaves neither chlorinated by-products nor unpleasant chemical tastes or odors
- Ozone is generated safely on-site and controlled on demand from air/oxygen and power
- No storage and handling of oxidants and other chemicals

The oxidative action of ozone

Ozone reacts quickly with a large number of compounds. In doing so, these compounds are attacked either directly by the ozone molecule or indirectly by the intermediately occurring hydroxyl radicals. Preferably the ozone is completely consumed entirely in this reaction process, releasing only oxygen. In case of remaining ozone in the off-gas, these residues are converted back to oxygen by a residual ozone destructor.

By combining ozone with UV or peroxide, advanced oxidation processes are formed which are able to reduce even the most persistent substances. These advanced oxidation processes (AOP) help to render other, previously non-degradable, water pollutants harmless.

The ozone generator

The central element in ozone production is the ozone generator, which produces the gas on-site from oxygen. Wedeco PDOevo series ozone generators are ideal for design engineers and plant operators who require reliable, efficient production of large quantities of ozone to meet their process needs. That's because PDOevo ozone generators have been pre-designed and engineered with customer requirements in mind. The result is one of the the most compact, cost-effective and reliable ozone generation systems capable of producing 1,000 to 15,000 lbs. of ozone per day or 18 to 300 kg per hour.

Xylem's Wedeco PDOevo ozone generators deliver maximum performance with a large range of customization options to meet specific needs. PDOevo systems feature advanced Effizon® evo 2G electrode technology and a superior generator design. The result is unequalled solutions in terms of performance, efficiency and operational stability.

Effizon evo 2G electrodes are the core components that use oxygen and energy in an efficient manner to generate ozone. The ozone production process also requires cooling water for heat dissipation and maintaining an efficient process. It is the sophisticated interplay between these components and processes that distinguishes the high efficiency, reliability and flexibility of Wedeco ozone systems.

Elements that achieve high efficiency, reliability and flexibility

ENERGY

Modern ozone systems require less energy than anticipated. With the Effizon evo 2G electrodes, Xylem has lowered the energy consumption by up to 25%. This means that Wedeco systems are among the most energy-efficient systems in the world.

OXYGEN

The Effizon evo 2G electrode technology allows up to 30 times less nitrogen dosing than comparable competitor solutions. This considerably reduces the formation of nitrogen oxides (NOx), as well as potential corrosion and performance issues. Furthermore, the technique is insensitive to elevated concentrations of hydrocarbons (THC) in the feedgas supply. This permits a high degree of flexibility when selecting potential gas suppliers. The flexibility even extends to the oxygen feedgas used. Wedeco generators can be designed and delivered ready to utilize different oxygen sources such as air, liquid oxygen, or on-site generated (PSA) oxygen.

COOLING WATER

Cooling of the electrodes with cooling water directly influences the efficiency of the plant. PDOevo ozone generators achieve maximum ozone production efficiency, even in situations with cooling water temperatures up to 35°C/95°F. Improved hydraulic generator design characteristics improve heat dissipation and limit mechanical stress to the electrode at the same time. Cooling of the power supply unit is integrated in the cooling concept using either air or water, depending on the system type.

PDOevo ozone generators. Customized to fit each and every plant perfectly.

The PDOevo ozone system has been engineered to produce large quantities of ozone both reliably and efficiently. The PDOevo series can also be customized and integrated to fit seamlessly into local conditions and processes.

PDOevo ozone systems come in two main configurations – Greenline and Smartline. The Greenline configuration delivers one of the most competitive lifecycle costs available on the market thanks to amazingly low energy consumption, and the Smartline supports truly low investment costs, without compromising reliability or ease of operation.

1 The pipework is made exclusively from stainless steel and is equipped with all necessary and desired monitoring and concentration measurement instruments. All fittings and instruments are arranged for ease of operation, maintenance and control. Inlets and outlets are designed to suit local conditions.

2 The ozone generator is equipped with Effizon evo electrodes from both sides.

3 The footprint is reduced by up to 20% as a result of the optimum arrangement of the generator vessel, pipework and electrical cabinets.

4 The air conditioning system separates the electrical components from the ambient air and ensures protection class IP 54. This allows operation under ambient conditions with high temperatures (up to 35°C/95°F), high humidity (up to 90%), and harsh or dusty surroundings.

Control and monitoring

A PLC system with a local HMI control touch screen panel takes care of internal control and monitoring of ozone production. Main brands such as Allen Bradley, Mitsubishi, Schneider or Siemens can be implemented depending on customer requirements. Network interfaces such as Profibus or Ethernet are included in the scope of options.

Maximize the ozone. Minimize the energy.

The Effizon evo 2G electrode, the core element of every PDOevo ozone system, enables achieving a level of reliability and energy efficiency that is unattainable with most other electrode technologies. The distinctive feature of this electrode is its unique double discharge gap. Ozone is formed on both sides of the dielectric, therefore lowering the applied specific energy and increasing ozone production.

The electrodes are manufactured from inert materials making them highly resistant to corrosion. This means that Wedeco ozone generators are practically maintenance free, making any regular cleaning or replacement of the electrodes unnecessary.

The overall optimized arrangement and vessel geometry further enhance the ozone production efficiency, while simultaneously achieving low specific energy consumption.

Creating ozone by silent electrical discharge

Effizon evo 2G electrodes create ozone using the principle of silent electrical discharge, transforming oxygen molecules to ozone. The high voltage field is applied between the grounded tube and the electrode, separated by a dielectric. A fraction of the oxygen molecules is split in the electric field and spontaneously form ozone molecules by combining with another oxygen molecule.

Options for Wedeco PDOevo ozone generators

A number of options are available for control of the process, which can be incorporated into the package during manufacturing. All necessary instrumentation, PLC logic, etc. would be included to provide the required level of control.

Options

Containerized systems	Insulated, lighted and painted container Complete alarm and safety concept according to international standards Electric heating and ventilation fan Network communications Profibus, Modbus, SCADA, etc.
Instrumentation and control	Ozone concentration control Ozone residual in water Redox Alarm monitoring and indication System control based on process signals monitoring
Feed gas supply	Liquid oxygen (normally supplied by the oxygen manufacturer) PSA – Oxygen (Pressure Swing Adsorption) Air preparation comprising air compressor, desiccant dryer, filtration
Ozone mixing and contacting	Side stream injection systems Fine bubbles diffusers Closed reactors Degassing tanks Demistors
Electronic process control	Operation panel Overall process control
Ozone destruction in off gas	Catalytic Ozone Destructors Thermal Ozone Destructors Blowers
Cooling water supply	Air / water cooled chiller units Heat exchangers

Technology engineered to deliver superior results to clients world wide

Maximum ozone availability

- Highest system availability, thanks to virtually maintenance-free Effizon evo 2G electrode technology; electrodes do not require any regular replacement or cleaning

Lowest lifecycle costs

- Lowest aftermarket costs on the market, thanks to virtually maintenance-free electrode technology
- High oxygen supply security at moderate costs as higher THC values pose no technical problem
- Nitrogen dosing up to 30 times lower than competitors
- Low specific energy consumption - further reduced by up to 25% compared to competitive ozone systems
- The broad system portfolio enables precision designing to suit your requirements

Maximum operating flexibility

- Ease of choice for local gas suppliers / qualities
- All ozone systems can be designed to operate with air, LOX or PSA oxygen
- Efficient operation at elevated cooling water temperatures (up to 35°C/95°F)
- Startup to maximum capacity in less than 2 minutes, thanks to reliable and thermal shock-resistant electrodes
- Smooth ozone capacity control (from 1–100%) to suit process requirements

Customer-oriented solutions

- System customization available to meet specific requirements
- Fundamental in-house process knowledge through Xylem's R&D department
- Complete process peripherals and customer solution available from a single source

Simple implementation and installation

- Experienced team of project engineers, application developers and service personnel
- Completely preassembled and tested
- Container solutions can be built to fit local requirements (preliminary work, building, etc.)
- Comprehensive connection options to superordinate controls (e.g. via SCADA, Profibus, etc.)

Simple maintenance and operation

- Local control touch screen panel (HMI)
- Easy access to all systems and fittings relevant to service
- Operation and diagnosis via network control (remote diagnostics)

Xylem |'zīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're 12,000 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

For more information on how Xylem can help you, go to **www.xyleminc.com**

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