xylem
Let's Solve Water

SMOevo PLUS Ozone Systems

LET'S SOLVE WATER AND MINIMIZE THE ENERGY

Water Solution BBTEC

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. If an easy-to-use system to fulfill small to medium ozone production requirements is needed, then look no further than Xylem's Wedeco SMOevo^{PLUS} ozone generators - a completely integrated system capable of producing 20 to 1,300 lbs. of ozone per day or 400 g to 25 kg per hour.

Xylem's SMOevo^{PLUS} ozone generators deliver maximum performance with a large range of customization options to meet specific needs. SMOevo^{PLUS} 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. The new SMOevo^{PLUS} consumes up to 60 % less cooling water compared to the SMOevo^{PLUS} standard solution and achieves 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.

SMOevo^{PLUS}. Engineered to be the best choice for every application.

The SMOevo^{PLUS} series of ozone generators combines maximum flexibility and reliability for small to medium ozone capacities. The ozone generator system and control unit can be combined and supplemented with numerous option sets that allow project-specific customization for almost all applications.

The ozone production vessel, power supply unit and control systems are installed on a compact, packaged skid requiring only minor service connections to complete the installation. Since all pipework, instrumentation and cabling are fitted and tested prior to delivery of each SMOevo^{PLUS} generator, the installation and start-up time on site are reduced by as much as 60%!

Wedeco SMOevo^{PLUS} generators are equipped with a PLC system for internal control and monitoring of the ozone system. The local interface panel ensures that operators can easily and quickly access system parameters and controls that are vital to the operation of an ozone generator.

1 The generator vessel and power supply are separate units and can be arranged separately as an option. Forklift access from all sides is also provided, allowing easy transportation and installation.

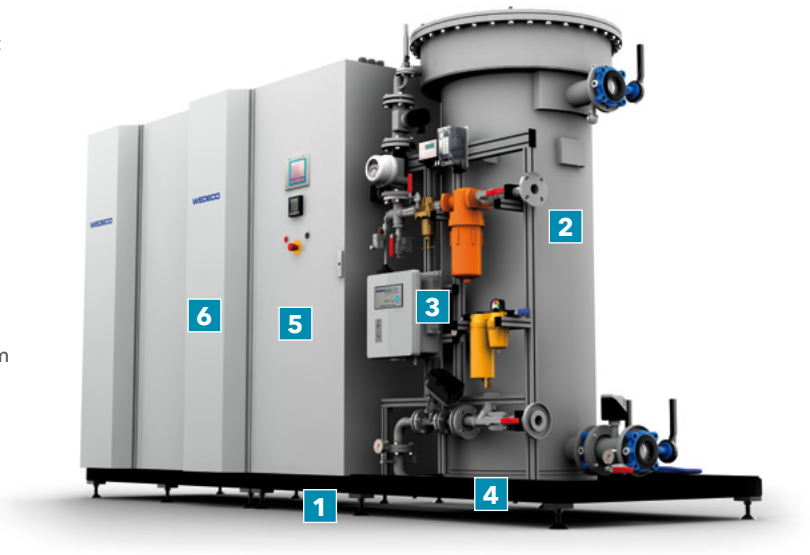
2 The ozone generator can be arranged either upright or horizontally to suit local requirements.

3 The pipework is made entirely from stainless steel, providing flange fittings where necessary, and is equipped with monitoring and optional concentration measurement instruments.

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

5 The power supply unit is equipped with state-of-the-art semiconductors technology (IGBT) for improved system control.

6 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.



Fast startup in seconds

The medium sized SMOevo^{PLUS} systems achieve automatic control of ozone production from 1–100% (using 1% increments), depending on the actual required amounts of ozone. Achieving the full rated ozone production capacity requires only a maximum time of less than 30 seconds – a decisive contribution to overall process control.

Integrated sustainability

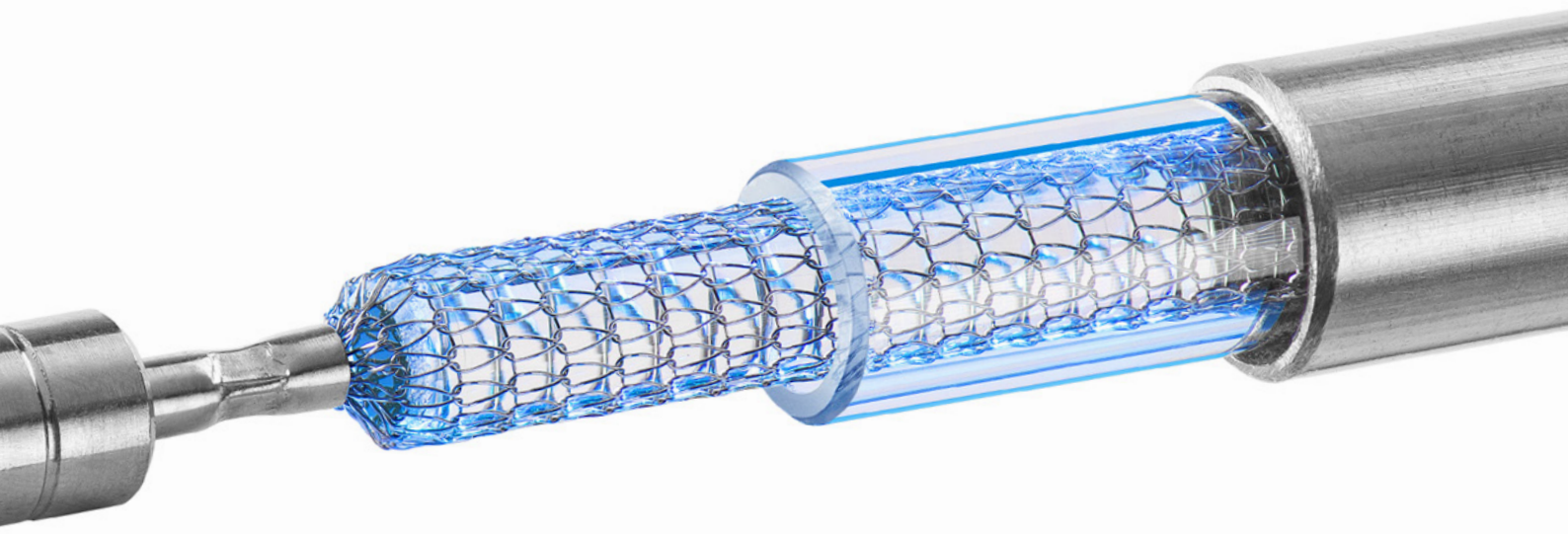
Wedeco ozone systems intentionally reduce the ecological footprint through minimized energy consumption and increased system reliability resulting in the use of less spare parts and maintenance. Consequently, CO_2 emissions are reduced. In addition, our production facilities conform to recognized international environmental management standards (ISO 14001).

Effizon® evo 2G – Intelligent Electrode Protection Making fuses a thing of the past.

The Effizon® evo 2G electrode, the core element of every SMOevo^{PLUS} 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.

Effizon® evo 2G electrodes are utilizing multiple, independently operated safety features are - Intelligent Electrode Protection (IEP). The IEP complements the existing active protection interlocks inside the power supply unit with an additional passive electrode protection. The IEP does not rely on active controlled processes thanks to the new glass core technology of Effizon® evo 2G electrodes. In contrast to traditional safety concepts, such as fuses or coatings, the innovative Intelligent Electrode Protection is not prone to any false detection in the event of electrode defects.



Creating ozone by silent electrical discharge

Effizon® evo 2G electrodes create ozone using the principle of silent electrical discharge, transforming oxygen molecules to ozone.

Medium voltage with variable frequency control is applied between the grounded tube and the electrode. Both elements are separated by a dielectric.

The unique dual gap electrode technology guides the oxygen gas flow across the electrical field formed on the inside and outside of the glass tube dielectric. A fraction of the oxygen molecules is split in the electric field and spontaneously form ozone molecules by combining with another oxygen molecule. This is resulting in efficient and increased ozone production on both sides of the dielectric element due to lowering the applied specific energy.

Options for Wedeco SMOevo^{PLUS} ozone generators

A number of options and ancillary equipment are available for supply with the Wedeco SMOevo^{PLUS} series ozone generators. 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
Instrumentation and control	Ozone concentration control Ozone residual in water Alarm monitoring and indication System control based on process signals monitoring
Feed gas supply	Liquid oxygen (normally supplied by the oxygen manufacturer) PSA – Oxygen (On-site generation, 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 destructor Blowers
Cooling water supply	Air / water cooled chiller units Heat exchangers

Technical data

	Ozone output from feedgas oxygen		**Ozone output from feedgas air**	
SMOevo^{PLUS} 410	2,37 kg/h	126 PPD	1,29 kg/h	68 PPD
SMOevo^{PLUS} 460	2,43 kg/h	128 PPD	1,34 kg/h	71 PPD
SMOevo^{PLUS} 510	4,64 kg/h	246 PPD	2,19 kg/h	116 PPD
SMOevo^{PLUS} 560	4,85 kg/h	257 PPD	2,68 kg/h	142 PPD
SMOevo^{PLUS} 610	9,29 kg/h	492 PPD	4,40 kg/h	233 PPD
SMOevo^{PLUS} 660	9,62 kg/h	509 PPD	5,28 kg/h	279 PPD
SMOevo^{PLUS} 710	12,06 kg/h	638 PPD	5,68 kg/h	300 PPD
SMOevo^{PLUS} 760	12,89 kg/h	682 PPD	7,11 kg/h	376 PPD
SMOevo^{PLUS} 810	15,40 kg/h	815 PPD	7,25 kg/h	384 PPD
SMOevo^{PLUS} 860	16,09 kg/h	851 PPD	8,86 kg/h	469 PPD
SMOevo^{PLUS} 910	22,90 kg/h	1212 PPD	10,78 kg/h	571 PPD
SMOevo^{PLUS} 960	23,81 kg/h	1260 PPD	12,98 kg/h	687 PPD

Cooling water temperature: 5°C - 35°C / 41°F - 95°F
Ozone concentrations: 2 - 6wt% (air); 6-15wt% (oxygen)

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
- Broad system portfolio enables precision designing to suit 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 only 30 seconds, 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 a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. 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 with a strong focus on developing comprehensive, sustainable solutions.

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

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